Facing Extinction
by Catherine Ingram

DARK KNOWLEDGE

"The heavens were all on fire; the earth did tremble."

–William Shakespeare

Henry IV, Part 1

For much of my life, I thought our species would soon go extinct. I assumed we might last another hundred years if we were lucky. Now I suspect we are facing extinction in the near future. Can I speculate as to exactly when that might happen? Of course not. My sense of this is based only on probability. It might be similar to hearing about a diagnosis of late stage pancreatic cancer. Is it definite that the person is going to die soon? No, not definite. Is it highly probable? Yes, one would be wise to face the likelihood and put one's affairs in order.

First, let's look at climate data. Over the past decade I have been studying climate chaos by reading scientific papers and listening to climate lectures accessible to a layperson. There is no good news to be found there. We have burned so much carbon into the atmosphere that the CO^2 levels are higher than they have been for the past three million years. In the last decade our carbon emission levels are the highest in history, and we have not yet experienced their full impact. If we were to stop emitting carbon dioxide tomorrow, we are still on track for much higher heat for at least ten years. And we are certainly not stopping our emissions by tomorrow.

This blanket of carbon in the atmosphere has triggered, and will trigger, further runaway

warming systems that are not under our control, the most deadly of which is the release of methane gases that have been trapped for eons under arctic ice and what is now euphemistically known as permafrost (much of it is no longer permanent frost).

Methane is a far more powerful greenhouse gas than carbon, and much faster acting. In the first twenty years after its release into the atmosphere, it is 86 times more potent than carbon dioxide. Whereas the full effect of heat from a carbon dioxide molecule takes ten years, peak warming from a methane molecule occurs in a matter of months.

The Arctic and Antarctic icecaps are melting at rates far faster than even the most alarming predictions, and methane is pouring out of these regions, bubbling out of Arctic lakes, and hissing out of seas and soils worldwide. Some scientists fear a methane "burp" of billions of tons when a full melt of the summer arctic ice occurs, something that has not happened for the past four million years. Should such a sudden large release of methane occur, the earth's warming would rapidly accelerate within months. This alone could be the extinction event.

The Arctic summer ice is currently two thirds less than it was as recently as the 1970s, and the arctic is warming so fast that a full summer melt is likely within the next five years. The continent of Antarctica is also rapidly melting at an acceleration of 280% in the last forty years. The massive ice melts that are happening there, such as the breaking off the Larsen B ice shelf defied scientific predictions; the ice shelf known as Larsen C, which broke off in July of 2017, was 2,200 square miles in size.

The Arctic ice has been the coolant for the northern part of the planet and it impacts worldwide climate as well. Its white surface also reflects back into space much of the heat from the sun, as does the Antarctic ice. As the ice melts, the dark ocean absorbs the heat and the warming ocean more quickly melts the remaining ice. Over the past three decades, the oldest and thickest of the Arctic sea ice has declined by a whopping 95%, according to the National Oceanic and Atmospheric Administration's 2018 annual Arctic report.

The U.S., Russia, and China are now vying for hegemony of the Arctic region in order to get at the massive reserves of oil that exist there and will be accessible as the ice melts. Aside from the real possibility of military conflagrations over control of the region, moving tankers through and drilling in this sensitive eco-system would cause the dual destructions of rapidly deteriorating whatever ice is left, thereby speeding up the release of methane; and then burning all that stored carbon of newly found oil reserves into the atmosphere.

These and all the other warming feedback loops are now on an exponential trajectory and becoming self-amplifying, potentially leading to a "hothouse earth" independent of the carbon emissions that have triggered them. Each day, the extra heat that is trapped near our planet is equivalent to *four hundred thousand* Hiroshima bombs. There are no known technologies that can be deployed at world scale to reverse the warming, and many climate scientists feel that the window for doing so is already closed, that we have passed the tipping point and the heat is on "runaway" no matter what we do.

We are now in the midst of the sixth mass extinction with about 150 plant and animal species going extinct per day. Despite the phrase "the sixth extinction" making its way into mainstream awareness via the publication of Elizabeth Kolbert's Pulitzer-prize-winning book of that title, most people still don't realize that we humans are also on the list.

Some of the consequences we face are mass die-offs due to widespread drought, flooding, fires, forest mortality, runaway diseases, and dying ocean life—all of which we now see in preview. A few of these consequences could even result in the annihilation of all complex life on earth in a quick hurry: the use of nuclear weapons, for instance, as societies and governments become more desperate for resources; or the meltdown of the 450 nuclear reactors, which will likely become impossible to maintain as industrial civilization breaks down. Since 2011, when a tsunami struck the northeast coast of Japan and caused a near meltdown of three nuclear reactors at the Fukushima Daiichi power plant, it has taken more than 42,000 gallons of fresh water per day to keep the reactors cooled. Keeping the radioactive elements contained requires dangerous jobs for the workers, and building a new steel water tank every four days to store the spent radioactive water.

If we were to make it through this gauntlet of threats, we would still be facing starvation. Grains, the basis of the world's food supply, are reduced on average by 6% for every one degree Celsius rise above pre-industrial norms. We are now about one degree Celsius above and climbing fast; the oceans are warming twice as fast and have absorbed a staggering 93% of the warming for us so far. If that were not the case, the average land temperatures would be a toasty 36 degrees Celsius (97 degrees Fahrenheit) *above* what they are now. Of course, there is a huge cost for ocean warming in the form of dying coral reefs, plankton loss, ocean acidification, unprecedented storms, and increased water vapor, which is yet another greenhouse blanket holding heat in the atmosphere.

As I became aware of these facts and many hundreds like them, I also marveled at how

oblivious most people are to the coming catastrophes. There has never been a greater news story than that of humans facing full extinction, and yet extinction is rarely mentioned on the evening news, cable channels, or on the front pages of blogs and newspapers. It is as though the world's astronomers were telling us that an asteroid is heading our way and will make a direct hit destined to wipe out all of life to which the public responds by remaining fascinated with sporting events, social media, the latest political scandals, and celebrity gossip.

However, beginning about five years ago, a few books and other sources of information began to address the chances of full extinction of all complex life, and these became my refuge, even though the information was the most horrific I had ever imagined.

For decades, I had sensed that things were dramatically worsening, the rate of destruction increasing. As a journalist from 1982 to 1994, I specialized in social and environmental issues. I had written about global warming, the phrase we used in those days, numerous times in the 1980s, but because it seemed a far-off threat, we could intellectually discuss it without fear of it affecting our own lives in terribly significant ways. As time marched on, I began to awaken to how fast the climate was changing and how negative its impacts. It became a strange relief to read and listen to the truth of the situation from people who were studying the hard data as it affirmed my instincts and threw a light on what had been shadowy forebodings, dancing like ghosts in my awareness. It is an ongoing study that has taken me through a powerful internal process–emotional and cathartic–one that I felt might be helpful to share with those who have woken to this dark knowledge or are in the process of waking to it, just as I, over time, found comfort in the reflections of the small yet increasing number of comrades with whom I share this journey.

Because the subject is so tragic and because it can scare or anger people, this is not an essay I ever wanted to write; it is one I would have wanted to *read* along the way. But the words on these pages are meant only for those who are ready for them. I offer no hope or solutions for our continuation, only companionship and empathy to you, the reader, who either knows or suspects that there is no hope or solutions to be found. What we now need to find is courage.

COURAGE

You got me singing, even though the world is gone

You got me thinking that I'd like to carry on

You got me singing, even though it all looks grim

You got me singing the Hallelujah hymm

–Leonard Cohen

"You Got Me Singing"

For the last quarter century of his life, Leonard Cohen was one of my closest friends. We would often talk at the small kitchen table in his modest home in Los Angeles until the wee hours of the morning, and when I would make a move to leave, he would bring out a fine port he had been saving or show me some of his recent drawings, or regale me with a story of his time in Cuba in the early Sixties. He loved engagement and there was no place in conversation he wouldn't go. In his company I never censored my thoughts. Since his passing I have realized that he was not only a close friend but a life mentor. One of the most inspiring aspects in this regard was what one could call his heart bravery. It is, in my way of seeing, the highest form of courage. In fact, the word *courage* comes from the Latin *coeur*, meaning *heart*. Leonard's special genius was his ability to communicate both the sorrow and the beauty of the world, even in the same sentence. He never looked away from either, not even in his final months when pain wracked his body. He had a twinkle in one eye and a tear in the other.

In those last years of his life, we had many conversations about climate chaos, as he knew I was studying the subject. He always listened intently and asked pertinent questions throughout our discussions. Although climate had not been his own focus (his was more a passion for world politics), there was no surprise for him in seeing how close we are to the edge. He understood human nature and assumed we would do ourselves in. One need only listen to his song, "The Future" to know how prescient he was on the matter.

And yet, we laughed over all the years. Laughed like crazy. Leonard was a master of gallows humor, and I have a well-honed appreciation for that form as well. The power of gallows humor, and I highly recommend it in these times, is that it allows a sideways glance at the gathering clouds while one is still sipping tea in the garden. All of these small moments of recognition serve to accustom our awareness to difficult realities, to hammer at the chains that bind, to allow us to let go a bit. In sharing gallows humor, it is also comforting to know that your friend sees the tragi-comedy as well. There is an amortizing of the burden when we share a heavy load.

Courage is often confused with stoicism, the stiff upper lip, bravado that masks fear. There is another kind of courage. It is the courage to live with a broken heart, to face fear and allow vulnerability, and it is the courage to keep loving what you love "even though the world is gone."

DISTRACTION AND DENIAL

> They are as children, playing with their toys in a house on fire.
>
> —Gautama Buddha

Never have these words of the Buddha been more prescient. We love to be distracted from ourselves, and we have myriad ways of doing that in our time. We pay big money for the privilege and we run about chasing objects and experiences in its service. We seem to be evolutionarily designed to put aside or entirely ignore future threats and instead focus only on immediate concerns and personal desires. This is understandable since for most of human history there was nothing we could do about future possibilities or events occurring far from where we lived. With some notable exceptions, evolution didn't select for long-term survival planning. Being concerned about climate change does not come naturally to us. Daniel Gilbert, author and Harvard professor of psychology, proposes four features of why our brains respond primarily to immediate threats.

First, we are social animals who have evolved to think about what the creatures around us are doing; we are highly sensitive to intentions, especially if they seem threatening. Second, climate change does not challenge our moral sense of right and wrong and thereby stir the brain to action. As Gilbert notes, if it was clear that global warming was deliberately killing kittens, we would all be marching in the streets.

Thirdly, unless climate chaos is a threat to us today, we don't think about it. I find that a lot of the data we see in conservative climate reports refers to horrific changes that will happen by 2100. When we see the year 2100, we easily think, "Whew! No problem." Of course, changes occurring by 2100 is an overly optimistic timeline, yet it shows how the brain responds to slow motion threat in the future, even when it will affect the lives of children whom we know in the present. Gilbert's fourth reason for why we ignore climate threats is that for millennia we have relied on our highly developed sense apparatus as physical

creatures to gauge changes and threats in our environment—changes of temperature, weight, pressure, sound, or smell. If changes occur at a slow enough pace, they can fly under the radar of our notice. The frog boiling in the pot that is only gradually being heated.

As I write this, there are historic floods in Queensland, Australia. The rivers have washed into the city of Townsville and there are now crocodiles and snakes in the flooded streets and in people's back yards. It might well concentrate the mind and promote a flight response to find oneself wading in floodwater on a street or yard that contained crocodiles and deadly snakes. But short of such clear and present dangers, our threat response is slow.

It seems even our genes favor short-term gain over long-term trouble. The twentieth century biologist George Williams recognized that, due to our genes having multiple functions, some genes have *opposing* functions. That is, for example, a gene can have great benefits for early life and at the same time cause great harm in later life, a process known as biological senescence. Evolution naturally selects for those genes since the organism doesn't always make it to later life, so the early benefit has been accrued while the later harm has less chance of being activated.

Biologist Bret Weinstein sees a cultural analog to this process, "culture is biology, downstream of genes." As he explains, "Ideas that work in the short term but fail and cause vulnerability in the long term tend to survive in our system because they often produce economic benefit. So if you produce a technology that has benefits for humanity over the course of several decades but the harm of that technology comes only in later decades, you will have become wealthy in the short term and that wealth will have resulted in an increase in your political influence, which will reinforce the belief structures that made it seem like a good idea in the first place. The market tends to see short-term gains and discount long-term effects until the political structure has been modified by that success. Just as in biological senescence, cultural senescence manifests in a system that is incapable of going in reverse and would drive itself off a cliff rather than recognize that something at is core was leading us into danger. We now have a cultural system that is making us very comfortable in the short term, but it is liquidating the wellbeing of the planet at an incredible rate."

Evolution also didn't select for us to be overly conscious of personal death itself. It would otherwise be emotionally paralyzing. Ernst Becker's seminal book *The Denial of Death*, for which he won the Pulitzer Prize in 1974, examined the awareness of death on human

behavior and the strategies that developed in humans to mitigate their fear of it. "This is the terror:" Becker wrote, "to have emerged from nothing, to have a name, consciousness of self, deep inner feelings, an excruciating inner yearning for life and self expression—and with all this yet to die."

Sheldon Solomon, author and legendary professor of psychology at Skidmore College, spent thirty-five years conducting experiments based on Becker's ideas. This body of work culminated in what Solomon and his colleagues call Terror Management Theory and relies on proving a central thesis of Becker's work: that it is through *cultural worldviews* and through *self-esteem* that humans ward off the terror of death. As Sheldon told me in an interview in 2015, "What Becker proposes is that human beings manage terror of death by subscribing to culturally constructed beliefs about the nature of reality that gives them a sense that they're valuable people in a meaningful universe...And so for Becker, whether we're aware of it or not, and most often we're not, we are highly motivated to maintain confidence in the veracity of our cultural worldview and faith in the proposition that we're valuable people, that is, that we have self esteem. And whenever either of those, what we call 'twin pillars of terror management,' –culture or self-esteem– is threatened, we respond in a variety of defensive ways in order to bolster our faith in our culture and ourselves." Listen to the full interview here.

Becker's work relied on examining defense strategies for denial of personal death. We are now faced with the death of all. Therefore denial and defense of denial are accordingly amplified and dangerous. There is now a desperate rise of religious fundamentalism, superstition, and new age magical thinking, as predicted in 1996 by astronomer Carl Sagan in his final book, *The Demon Haunted World: Science as a Candle in the Dark*. To an increasingly anxious species, cultural and religious belief systems offer the promise of eternal life. And people will literally fight to the death for them.

Or they will offer up their children. From the Mayan priests who threw children from cliffs to the families of suicide bombers in present time who joyously celebrate the martyrdom of their son or daughter in the streets with their friends, people would rather see their children die than forego the preservation and defense of their culture or religion. In places where climate chaos is already underway, we are seeing a solidification of tribalism and battle lines drawn between communities who have formerly lived together in relative harmony. These pressures are bound to increase.

We also find it difficult to think exponentially. We might grasp the concept of an exponential factor but it is not our natural way to perceive. Therefore, as exponential warming triggers other imbalances that also become exponential, we perceive them only as linear problems and assume we will have time to address them. We carry on with business-as-usual and return to "the matrix," the illusion that things are fairly normal, where our ordinary problems, comforts and entertainments await our attention, just like in the movie. But we have now come to the point of "amusing ourselves to death," as Neil Postman put it in his 1985 book by that title.

As you begin to awaken to the specter of extinction, you will likely feel the powerful lure of your usual distractions. You may want to go back to sleep. But denial will become harder and harder to maintain because once your attention has turned to this subject, you will see the evidence of it everywhere, both locally and globally.

And you will find yourself among the throngs of humanity who are easily distracted and amused, playing with their toys as the house burns, "tranquilized by the trivial," as Kierkegaard said, and speaking of the future as though it was going to go on as it has. After all, we made it this far. We have proven our superiority at figuring things out and removing obstacles to our desires. We killed off most of the large wild mammals and most of the indigenous peoples in order to take their lands. We bent nature to our will, paved over her forests and grasslands, rerouted and dammed her rivers, dug up what journalist Thom Hartman calls her "ancient sunlight," and burned that dead creature goo into the atmosphere so that our vehicles could motor us around on land, sea, and air and our weapons could keep our enemies in check. And now we have given her atmosphere a high fever. But, as the old adage has it, (a phrase I first heard in the 1980s, which has informed me ever since), "nature bats last."

You may find yourself in the company of people who seem to have no awareness of the consequences we face or who don't want to know or who might have a momentary inkling but cannot bear to face it. You may find that people become angry if you steer the conversation in the direction of planetary crisis. You may sense that you are becoming a social pariah due to what you see, even when you don't mention it, and you may feel lonely in the company of most people you know. For you, it's not just the elephant in the room; it's the elephant *on fire* in the room, and yet you feel you can rarely say its name.

I once asked Leonard for his advice on how to talk with others about this. He replied:

"There are things we don't tell the children." It is helpful to realize that most people are not ready for this conversation. They may never be ready, just as some people die after a long illness, still in denial that death was at their doorstep. It is a mystery as to who can handle the truth of our situation and who runs from it as though their sanity depended on not seeing it. There is even a strange phenomenon that some of my extinction-aware friends and I have noticed: you might sometimes find relaxation in the company of those who don't know and don't want to know. For a while you pretend that all is well or at least the same as it has been. You discuss politics, the latest drama series, new cafes. You visit the matrix for a little R & R. But this usually doesn't last long as the messages coming from the catastrophe are unrelenting.

The Parent Trap: There is one category of people that I have found especially resistant to seeing this darkest of truths: parents. A particular and by now familiar glazed look comes over their faces when the conversation gets anywhere near the topic of human extinction. And how could it be otherwise? It is built into the DNA that parents (not all, of course) love their children above themselves. They would sacrifice anything for them. So to think that there will be no protection for their children in the future, that no amount of money or homesteading or living on a boat or in a gated community or on a mountaintop or growing a secret garden will save them is too unbearable a thought to hold for even a second. I have also noticed a flash of anger arise in the midst of the distracted look on their faces, an almost subliminal message that says, "Don't say another word on this subject."

It is a subject I have learned to avoid in the company of parents although, to my surprise, I am recently finding more of them coming to terms with it. It is an added layer of grief, to be sure, and I can only admire and grieve with them in the knowledge that it is unlikely their children will live to old age, leaving aside what they may suffer beforehand.

I had my own battle of despair with this. As I began to realize the gravity of our situation, I quickly recognized that my own death was not much of an issue. After all, I have lived a long time, longer than most people in history. I certainly have preferences about how I would like to die, and I don't make any claims about having no fear of death at all, but the *fact* of my own death is something I have considered since my teenage years and has been part of my many decades of *dharma* interest. No, the despair came from the thoughts about my young great nieces and great nephew with whom I am close. All nine of them were under the age of ten when I began to realize that they are not likely to have a long life. The anxiety and despair into which I sank was such that I became very ill. I developed a massive case of

shingles covering large areas of my torso, front and back in two zones (apparently it is rare to have more than one zone) and I ended up in the hospital. Shingles (way too puny a word for a disease that feels like your nerves have been set on fire from the inside) is considered a stress-related illness. My anxiety and despair had made me physically sick. Once home and bedridden for the best part of a month, I had a chance to assess how unaffordable my fear and anxiety would be going forward. I had to find a perspective that would allow me to access at least some quiet underneath the profound sadness, some whisper that says, "This is the suchness of things. Everything passes."

Of course, there are now many millions of parents in the world who have already had to come to terms with this. Hundreds of millions of climate refugees for whom any fretting about the future would seem the greatest of luxuries and privileges. They are struggling for survival due to climate catastrophes, even as you read these words.

SOCIAL UNREST

I've seen the future, Brother.

It is murder.

—Leonard Cohen

"The Future"

Of all the threats we face, the one I find most frightening is the breakdown of civilized society. We now see large regions of the world that are no-go zones–failed states, where life is cheap and barbarism reigns. Huge swaths of Africa are now lawless and controlled by armed and violent men and boys roaming the countryside in gangs, engaged in despicable acts too sickening to write. The Middle East is much the same as are parts of South America. All of these areas are enduring severe drought. As professor and journalist Christian Parenti said in an interview with Chris Hedges, "How do people adapt to climate change? How do they adapt to the drought, to the floods? Very often, the way is you pick up the surplus weaponry and you go after your neighbor's cattle or you blame it on your neighbor's ideology or ethnicity."

In his book, *Tropic of Chaos: Climate Change and the New Geography of Violence*, Parenti writes: "Climate change arrives in a world primed for crisis. The current and impending dislocations of climate change intersect with the already-existing crises of poverty and

violence. I call this collision of political, economic, and environmental disasters "*the catastrophic convergence*."

In their desperation, people, especially women, sell themselves into prostitution and other forms of modern slavery. Or they are taken and sold by others. Human trafficking is now big business worldwide. People also sell their own children to save the rest of their families. I saw a CNN news interview with a widow and her son and daughter in a refugee tent in Afghanistan. Having left the drought-ridden area of her home region, she was explaining to the reporter that she was selling her six-year-old daughter to an old man so that she could feed herself and her son. The little girl sat quietly by her side, looking sad and bewildered, perhaps dimly aware that whatever change to come in her already difficult life was going to be a far worse fate. Nearby sat the old man who was purchasing her as a "gift" for his ten–year-old son, this rationale most likely for the benefit of the reporter, one that I didn't believe as I suspected an even darker plan for the little girl. Apparently, this is a common practice now in the Afghan refugee community.

It is no wonder that people leave these hellholes with nothing but the clothes they are wearing and make their way, often risking death, to countries of greater abundance and saner policies. It is also no wonder that those countries don't want them. At some point in loading a rowboat, even one extra person will sink it. And many of the refugees are nationals of countries with almost opposite values of those of their new host countries. Europe is now on the front lines of the refugee crisis and is struggling to hold itself together. It is one of the great historical ironies that the European countries, perhaps the most enlightened and progressive of all time, are employing greater and greater draconian measures to try to preserve what they have. But the refugees will keep coming, in the millions and then the hundreds of millions, and there will be no walls or armies strong enough to stop them. This is true not only for Europe but anywhere there is potential for a better life.

The places where there still exists "a better life" are rapidly deteriorating as well. In Chris Hedges' book, *America: The Farewell Tour*, he forensically chronicles the decline of 21ST century America. The "flyover" states, that is, almost everywhere except the coasts, are ridden with poverty, alcoholism, prostitution, drug and gambling addiction, porn addiction, violence, inferior education, depression and other mental illnesses, poor physical health, and suicide. "The diseases of despair" as sociologists call them. In fact, for the past two years, average life expectancy in the USA has declined due to suicide and opioid overdoses. The

U.S is now in the midst of the worst drug epidemic in its history; more people die from opiate overdoses than from car accidents or gun homicides. Due to the poverty existent in these communities there is also a breakdown of law and order as well as basic services. The local municipalities are going broke and are beginning to function like banana republics.

Pacific Gas and Electric (PG&E), the largest utility company in the United States, provides gas and electric power for two thirds of California. It just filed for bankruptcy protection against lawsuits of an estimated thirty billion dollars due to its power lines blowing about and possibly starting some of the deadly fires that recently occurred in California. Who bails out the utility companies when these things occur? The Federal Government, which means the taxpayers get the bill. How long can governments bail out corporations? The US national debt, for instance, now stands at *22 trillion dollars.* At what point is the "let's pretend" game of currency value over? How long will we be able to exchange pieces of paper for food? And what will happen when we are forced to make extreme sacrifices?

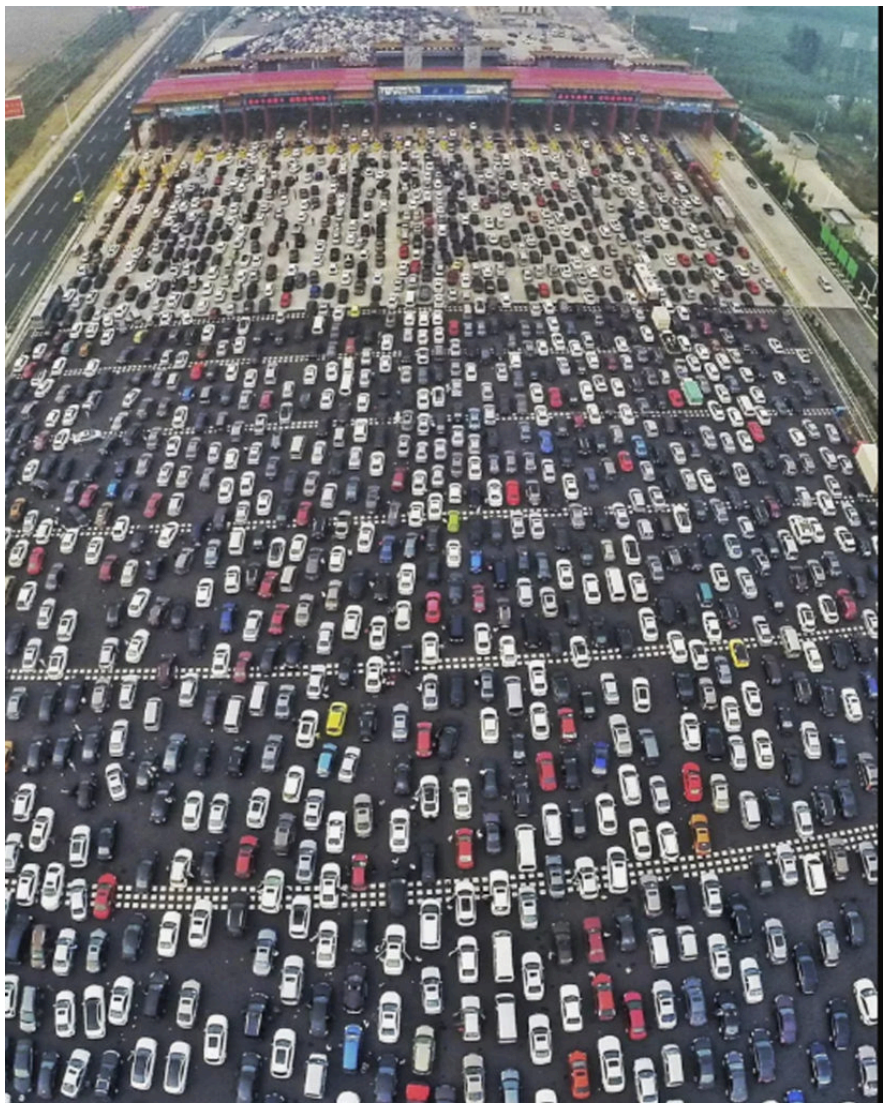
The richer countries are particularly intolerant of making even relatively small sacrifices that might have a future benefit. As I write these words, France is in the third month of "yellow vest" riots that began in Paris and spread throughout the country.

The fracas started when French President Emmanuel Macron announced an "eco-tax" on fuel in an attempt to fulfill his campaign promise to address global warming. Soon after the rioting began, the government walked back any talk of the tax, but by then the rioters had added on a host of other grievances and the mayhem began to grow, becoming more violent, destructive, and deadly. These are not people who are starving or being removed at gunpoint from their homes. These are people who are being asked to sacrifice some of their income for the greater good. But as we are seeing there and elsewhere, short-term greed prevails.

What is happening in France is no doubt a cautionary tale to other progressive world leaders who dare to challenge Big Oil and its hungry consumers. It is a mark of immaturity to be unable to delay personal satisfaction for the chance at greater wellbeing for all at a later date. And it is yet another wearisome example of why we humans are in the mess in which we find ourselves. We see it throughout human history. Greed is not new to modern times. We can easily understand the greedy impulse as most of us are afflicted with it. Perhaps the evolutionary imperatives from ancient times would have had no use for delayed gratification since servicing immediate needs often meant the difference between life and

death. However, we can now see that being enslaved to our base desires and impulses is contraindicated to our survival. Seeing disintegrations occur in the developed countries gives a glimpse as to what societal and economic breakdown will look like when there are widespread food shortages everywhere and when the infrastructure, including the electric grids, become spotty, too costly to maintain, or are no longer working.

OVERPOPULATION AND CO-EXTINCTIONS



Fifty-lane traffic jam in China

In 1952, when I was born, there were approximately 2.6 billion people on earth. There are now 7.7 billion, a nearly threefold increase in my lifetime. Our use rate of resources would allow for our planet to sustainably host only about one billion people. As William Catton explained in his 1980 book Overshoot, we are in "carrying capacity deficit." In other words, the load on resource use is far in excess of its carrying capacity. Of course, the only way we have been able to pull this off is by stealing from the future, just as we might have a garden of food that could last ten people through the winter

and instead we have a wild party for a thousand and go through the entire supply in an evening.

It is also troubling to realize that whatever reasonable measures we might attempt to mitigate our situation, and there are none known that can be done at scale, the addition of roughly 220,000 humans per day (births minus deaths) would curtail our efforts at mitigation.

According to many scientific studies, some of the inevitable outcomes of overpopulation are severely polluted water, increased air pollution and lung diseases, proliferation of infectious diseases, overwhelmed hospitals, rising crime rates, deforestation, loss of wildlife leading to mass extinctions, widespread food shortages, vanishing fish in the oceans, superbugs and airborne diseases along with diminished capacity to treat them, proliferation of AIDS, less access to safe drinking water, new parasites, desertification, rising regional conflicts, and war. As astrobiology professor Peter Ward explained in a story on the BBC, "If you look at any biological system, when it overpopulates it begins to poison its home."

Of course, when we speak of overpopulation we specifically refer to humans. In fact, human activity is causing massive die-offs of the other species. With overpopulation and pollution we lose habitats that sustain biodiversity and we have consequently lost 60% of the world's wildlife since 1970.

Only our livestock are growing in numbers. Think about that phrase in its two component words: "live" and "stock." Animals as stock, as product. To view animals as products requires ignoring the plight of these living creatures: the industrial food systems of torture for hundreds of millions of animals–animals who have emotions, care for their young, and who suffer fear and pain only to be slaughtered in the end, perhaps the only mercy they will know. Industrial animal farming is also known to be one of the top causes of global warming.

The biodiversity loss of *wild* animals and plants, however, creates a domino effect into what is called *co-extinctions:* when a species at early risk of environmental changes dies, the various species that depended on that one die, and then the species that depended on those die.

The domino effect in extinctions goes into yet another exponential feedback trajectory. Scientists Giovanni Strona and Corey Bradshaw conducted an experiment in which they

computer-modeled "2,000 virtual earths to create conditions of species-like entities arranged in interconnected ecological communities." They then subjected those communities to various environmental stresses, particularly those of temperature. What they found can be gleaned from the title of their peer-reviewed paper, published in *Scientific Reports*: "Co-extinctions Annihilate Planetary Life During Extreme Environmental Change." In other words, the health of the interconnected natural world depends on the web of life within it. When substantial parts of that web die off, it *annihilates* planetary life in general. This includes, of course, the higher and more complex forms of life. That means us. Thinking that we can lose most of the biodiversity of planetary life and still find ways to feed ourselves is delusional.

Along with all of the other threats we face, co-extinction within the natural world is becoming one of the most pressing problems. For anyone familiar with General Systems Theory, this is easily intuited. Yet many people compartmentalize information when they hear of extinctions of the other plants and creatures and think it has little to do with their own existence. They see the iconic image of the polar bear floating on a small ice chunk and think, "What does the loss of polar bears mean to my life? Nothing." They might, however, be surprised to learn that the loss of the world's insects is going to impact everyone on the food chain as the pollination of plant life dramatically slows.

A recent article in the New York Times entitled "The Insect Apocalypse Is Here" explains also the concept of "functional extinction," that is when a species is still present but so diminished in its numbers that it no longer functions or interacts within its environment. In the case of insects, for example, it results in "an extinction of seed dispersal and predation and pollination and all the other ecological functions an animal once had, which can be devastating even if some individuals still persist." It doesn't require a full-scale extinction of insects or other species to disrupt their necessary role in a healthy eco-system. A partial die-off will do the job. Inability to grow fruits, vegetables, and grains in the food-growing regions will inevitably lead to soaring food prices and starvation for millions.

Understanding the ills of overpopulation and co-extinctions puts one in the difficult position of concern for people bringing babies into the world. For the first time in history, it is hard to celebrate the arrival of newborns when one is aware of the deadly pressures of overpopulation, climate chaos, and collapse of our life support systems. It is sad to think of what a new little being is likely to endure. And as his or her parents awaken to the global reality, they will likely face increasing anxiety and sorrow. Once you come to know a child,

whether your own or anyone else's, your love for the child makes for a heart-wrenching worry, especially if you are responsible for bringing that child into this world.

I encourage people to save a baby, not have a baby. Consider adopting one of the millions of children in need of a loving parent and give that child a happy home for as long as possible. You will need to override the evolutionary imperative to give birth to your own. We are, in our time, confronted with many such challenges to the usual imperatives of evolution and assumptions therein.

TECHNO FIXES AND ESCAPE TO MARS

We humans love technology. It has been the means by which we became the dominant species on the planet, doubled our life spans, traveled the globe collecting resources and ideas, and hooked ourselves up to instantaneously connect with anyone anywhere from our own homes. It is a source of entertainment, education, artistic creativity, medical advances, and uses too numerous to list. It has also been a source of destruction. It has allowed us to rapidly denude and poison the eco-system and caused the extinction of much of the natural world.

Energy and industrial technologies have destabilized and poisoned our atmosphere and waterways. Our cyber technology has created a global industry of online financial theft, child pornography and predation, identity theft, illegal drugs, and many other criminal endeavors made possible through the internet. War technologies have made us the most effective killing species ever in history. In the 20th century, the deadliest in history thus far, an estimated 231 million people –most of them non-combatants–died in war and conflicts. High tech weaponry in the 21st century is even more capable of large scale death and destruction at the push of a button from thousands of miles away.

As Joanna Macy told me in an interview more than thirty years ago, "We think technology will save us. Technology got us into this mess."

And yet, many people assume technology will indeed address our gnarly ecological problems by changing *us* to adapt to the problems or by simply moving away from Earth altogether. Some of the *technotopians*, those who think technology will create a future

utopia, want to send us to Mars. There are also those who are hoping we can discard our biological selves altogether (who wants to drag around a carcass of meat?) and instead just download our consciousness into computers and thereby live forever. *Thinking forever.*

Or we might prefer to be part cyber and part human. Elon Musk, CEO of Tesla and Space X, and co-founder of Neuralink has plans in the works that will allow us to inject a computerized neural mesh into our brains, a lace-like filament that unfurls itself onto the brain and creates the capability to interface with a computer. The procedure would allow digital knowledge to be directly stored and accessed through one's own gray matter. This blend of digital and biological technology would, in Musk's view, give us a chance against what he sees as the coming threats of unregulated artificial intelligence.

Musk is also working on plans to colonize Mars. He sees the possibility for humans to become "a multi-planet species," which he imagines will alleviate our problems on earth, especially if World War III were to erupt. He envisions a first tier of travel to the Red Planet in thirty-five-story rockets that he is currently designing. Musk's plan also includes domed, terra-formed, sealed enclosures in which people will live on Mars the entirely of their days and nights (after all, they cannot go outside due to there being almost no oxygen, an atmosphere of 95% carbon dioxide, radiation levels of the equivalent of 24 CAT scans per day, and average temperatures of minus sixty-three degrees Celsius). Bill Maher did a hilarious and insightful segment about moving to Mars on his show, "Real Time with Bill Maher.

In planning a move to Mars it might also be useful to consider the psychological impacts of earthlings living in close quarters with each other and having no contact with the outside world. As a pre-curser to a Mars colony, we tried something like this on Earth in the early 1990s. It was called Biosphere 2 and was an attempt to replicate Earth's bio systems in a completely closed greenhouse facility covering about three acres in the Arizona desert. The structure contained seven "biomes," (various bio regions, such as a rainforest, mini ocean, coral reef, mangrove, savannah) and was home for two years to eight crew members, known as "biospherians," who grew their own food within and kept the internal systems running.

Except that there were problems. Soon into the experiment, which began in 1993, carbon dioxide levels began to rise and oxygen and food levels began running low. In addition, there developed a syndrome called "irrational antagonism," in which rifts and estrangements

among the eight crew members resulted in a four-against-four tribalism that continued to the end of the experiment. As Jane Poynter, one of the original eight, said in a TED talk: "We all went quite nuts, I will say." A year later in the second attempt at Biosphere life, a new group were able to grow enough food and didn't need added oxygen, but they were only in the facility for six months. In any case, when problems involving oxygen, food, or water arose, help was only a phone call and a short jaunt away, instead of thirty three million miles.

I have watched many interviews with Elon Musk. I like him. I don't see him as Dr. Evil. He is akin to the genius kid in class who excitedly shows you the power grid he built with his Lego set. Musk and the engineers re-fashioning nature are part of a long line of techno wizards who have made our epoch into what is now called the Anthropocene, "the geologic age in which human activity is the dominant influence on climate and the environment."

It has been our historical privilege to have new frontiers of untapped resources whenever we overshot any given region. We could always move to another place, either one that was uninhabited or one that might require that we negotiate with, subdue, or eliminate the people who were already there. The earth was large and abundant for most of human history. But it is now rapidly shrinking; that is, we are much more in number while the habitats that can support life are far fewer, as Bill McKibbin details in a 2018 New Yorker article entitled, "How Extreme Weather is Shrinking the Planet."

The actual "economy" now is the world population in relation to the habitats that are capable of sustaining life. In this we are in deficit. And so, it may seem a great idea for people such as Elon Musk and others to find new ways for human life to continue, either in space or with a new kind of brain.

Geo-engineering, or climate engineering, is a more realistic form of techno-fixes in that many of the proposals are more possible than cyber tweaking our brains, downloading consciousness, or moving to Mars. For that reason, geo-engineering is more disturbing as it is likely to be increasingly deployed when the world soon becomes more desperate.

One type of geo-engineering involves solar radiation management (SRM), the attempt to reflect sunlight back into space. Proposals for this include spraying tons of sulfates (or, slightly less worrisome, salt crystals) into the atmosphere to block sunlight, and modifying clouds, plants, and ice to make them more reflective. In the spring of 2019, a group of Harvard scientists plan to test a new technology designed to block sunlight by releasing

calcium carbonate into the stratosphere over the US southwest. One obvious problem with SRM is that, leaving aside potentially deadly impacts of messing with the very air we breathe, we will still be heating up from the ground. It might be akin to putting a sun reflector on the window of your car on a hot day. The car is still heating up inside but a little less fast.

Another type of geo-engineering is known as *carbon capture and sequestration*, (CCS) which involves removing carbon from the atmosphere and building facilities to store it. One of the many proposals being considered is to seed the ocean with iron pellets to create plankton blooms, which sequester carbon. Another route along these lines is known as Bio Energy Carbon Capture and Storage (BECCS). An example of this, which is now a "demonstrator" project in the U.K, is to burn wood and then capture the carbon, the idea being that trees sequester carbon, so growing and burning them at a nearby capture facility would create negative carbon emissions. Critics of this method say that it does not accurately calculate the costly energy processes (and carbon emissions therein) involved in such a roundabout endeavor.

If reading about these methods makes you queasy, you are not alone. Many of us intuitively resist messing with the atmosphere or creating methods that allow carbon emissions to go on as before in the deluded belief that we are handling the situation. There is the concern that unintended consequences may likely speed up the destruction. And there is an almost cellular sadness at the thought of human hands now further manipulating the climate after we have already put it so far out of balance. But many people want to try geo-engineering, even though a great deal of data shows how ineffective, carbon costly, and dangerous it is.

Clive Hamilton, Professor of Public Ethics and a member of the Climate Change Authority of Australia, goes into this in depth in his detailed book, *Earth Masters: The Dawn of the Age of Climate Engineering.* See also Greenpeace's report on carbon capture, sequestering, and storage.

Geo-engineering plans are chilling because they are being proposed not merely by conspiracy kooks but by some of the wealthiest, most powerful, and brilliant engineering minds of our time. And they are being funded by coalitions of big oil and gas companies, along with governments, who rely on science that deemphasizes negative impacts.

Although profit is no doubt a strong motive, it is useless to demonize people who are pursuing these paths, especially when they feel they are mitigating a crisis. But it is also

important to understand that their wisdom may not be as developed as their particular forms of intelligence. It is not necessarily true that just because a technology is possible, we should try it because we are in crisis. ("If we could do it, we should do it.") We have ignored, now to our peril, the long-term consequences of many of our technologies and put these technologies online without public discussion.

As Jerry Mander, told me in an interview in 1991 following the publication of his book *In the Absence of the Sacred: The Failure of Technology and the Survival of the Indian Nations,* "New technologies are introduced to us without a full discussion of how they are going to affect the planet, social relationships, political relationships, human health, nature, our conceptions of nature and of ourselves. Every technology that comes along affects these things. Cars, for example, have changed society completely. Had there been a debate about the existence of cars, we would have asked, 'Do we want the entire landscape to be paved over? Do we want society to move into concrete urban centers? Do we want one resource–oil–to dominate human and political relationships in the world?' Our culture lacks a philosophical basis, an understanding of the appropriate human role on earth that would inform these developments before they happen. Such an understanding would enable us to say, no, we cannot go in that direction because it is desacralizing of life, a failure to be grounded in the natural world and lacking any sense of limits. You see, once you're living in an industrial, technological society, choices become much more difficult. Even if you believe that cars are inappropriate, you almost cannot function without the use of a car. You can't function if you don't have a telephone or a computer–unless you retire from participation."

The disparity between wisdom and intelligence may be the inevitable downfall of many other kinds of life in the universe as well. There is a theory known as The Great Filter, which seeks to explain why, despite the overwhelming odds of there being life on other planets, we have not heard from any of them. Astrophysicists have now calculated that in the known universe there are about 10 billion trillion planets that would have what they call "a goldilocks zone," planets whose orbits are in a particular proximity to their star that is similar to our own, not too close and not too far. Just right.

The Great Filter proposes that before a civilization reaches the level of development that would allow for intergalactic communication and travel, it wipes itself out through climate change, overpopulation, or other factors having to do with the rise of technological civilization. As Adam Frank, a professor of astrophysics at the University of Rochester, New York, explained in an interview with Chris Hedges, "If you develop an industrial civilization

like ours, the route is gonna be the same. In particular, you are going to have a hard time *not* triggering climate change. Unlike (with) nuclear war. For a civilization to destroy itself through nuclear war it has to have certain kinds of emotional characteristics, right? You can imagine some civilizations (saying), 'I'm not building those; those are crazy!' But climate change, you're not going to be able to get away from. If you build a civilization, you're using huge amounts of energy; energy that feeds itself back on the planet, and you're going to push yourself into a kind of Anthropocene, so it is probably universal. And then the question is, "Does anybody make it through?"

After all, each and every one of us is a heat engine. Studies at MIT and elsewhere have shown the global average carbon emission footprint per person per year is four tons (the American average per person is twenty tons per year).

I first read The Great Filter theory a few years ago. It made sense to me then and ever since. In previous years, I had considered our predicament as a "species problem," that we had a terrible kink in our evolution that made us ecocidal, homicidal, and suicidal. But the theory of The Great Filter allowed me to see that humans are just doing what we were evolutionarily destined to do. It is not an aberration of evolution, even though it will destroy all complex life. Nor is it is the result of any one thread of evolution, any particular age or technological advancement or economic system.

Take capitalism for instance. It is unsustainable at its core as it relies on continued economic expansion and growth in a system of finite resources. In the process, it also speeds up the complete elimination of the very resources on which it relies. But the problem is that the human creature will postpone challenging that system as long as the goods keep flowing, no matter the future costs. Capitalism is a perfect representation of the human need and greed for *more*, future be damned. Very few cultures in modern civilization have managed to resist it. There is now a lot of false hope around "Green Capitalism" and the Green New Deal in the USA. Given that capitalism, of any color, inevitably relies on extraction of resources in the production or transport of goods, feeling encouraged about Green Capitalism is another form of deluded *bargaining* in the Kubler-Ross stages of grief. As Derrick Jensen elegantly defines it: "Capitalism is a system by which the living is converted to the dead."

Capitalism itself is heading to its own extinction. As resources dwindle and the numbers of people vying for them increase, we are facing collapse of the largest Ponzi scheme of all, the global financial system.

THE END OF LEGACY

As your awareness metabolizes the deadly threats ahead and the unlikeliness of solutions that will change the course, you might find a strange re-ordering of your thoughts and motivations. For one thing, you will no longer need to consider what you might leave behind as there will not likely be anyone there to see or experience it, at least not for long.

There is a cognitive dissonance that takes getting used to when you realize there is no need to consider how you or your name will be remembered in the future. Not only that, your interest in future projections about life begins to fall away. You may marvel at how many personal conversations with people you know or news items from around the world assume that human life carries on indefinitely. You may find it difficult to hold interest in these conversations and stories, as though you chanced upon a madman on a street corner earnestly proclaiming his grand plans for the future when it is clear he is hallucinating. You don't hang on his every word.

But the habit of *future thinking* is a hard one to shake.

People are often conditioned in the idea of leaving behind a legacy and they spend a lot of their lives in perhaps an unconscious dedication to that project. They erect monuments to their names or the names of their loved ones in myriad ways, from India's Taj Mahal to a name on a park bench in their hometowns. They build financial empires or leave behind bodies of work, creations of art, literature, ideas, and inventions. Some people might simply want to live in the memories of those whom they loved.

But the most common and by far the most emotionally charged form of legacy is in having children. These times challenge all the usual joys and hopes parents might have in seeing their children grow. You watch them cramming for exams, learning to play the violin, applying for programs, or any other training or activity in which hard work and study in the present promises future advancement, and your heart aches. In facing extinction, you find yourself thinking, "What's the point of all that effort; should they even bother going to school? Maybe we should just find ways to enjoy whatever time is left with our children without any future goals." You may wonder if you should spend down your bank account if you are so privileged as to have surplus wealth.

Letting go of the future means re-ordering your tendencies of thinking about the future. How psychologically invested you have been in your ideas and hopes about the future will likely determine how well you adapt to ignoring those kinds of thoughts as they arise. You may also find a stronger habit in present awareness begin to prevail. And if your own legacy project entailed a lot of stress and strain in hopes of building (or maintaining) a name for yourself, you may even find great relief and freedom in the irrelevancy of those thoughts and their incumbent efforts. You may be released from both the legacy project for the future and a similar project in the present, one that I call "The Me Project," which is dedicated to self-importance and is in particular vogue among social media addicts.

Of course, that doesn't mean your life-affirming acts in present time are irrelevant. Pulitzer Prize winner and U.S. Poet Laureate W.S. Merwin wrote: "On the last day of the world, I would want to plant a tree." It is the purest kind of offering, one that has no possibility of future reward. We, too, can make our final acts on earth a testament to the human capacity for mercy, a living bow to our highest good—for its own sake–even though it will not save the day.

NO BLAME

You may feel fury at times in seeing the desecration of the natural world and in realizing its destruction is due to human activity on the planet. It seems tragically unfair that one species could cause the elimination of almost all the others. The rate of extinction is now about 1,000 times faster than before humans arrived. It is natural to want to load the blame somewhere. We want to have a first cause onto which we can displace our anger and have a sense of control. "If only we hadn't developed agriculture" (which allowed for long term food storage and overpopulation) "If only the world had been run by matriarchies," "If only we had a bottom-up economic system." "If only we had all learned to meditate." If only.

In a recent blog post, writer James Kunstler proposed a pithy theory of why humans chose each step of our path in history: "It just seemed a good idea at the time." We plunged forward with each new way of doing things, each new invention, because it made life easier *at the time*. There was no intention to destroy ourselves. On the contrary, for most of the time since the Industrial Revolution, it seemed that life was getting better for greater numbers of people. With medical advances, we wiped out most of the contagious deadly

diseases, controlled infections, and greatly extended life expectancy. We built transportation capabilities that allowed us to travel to the far ends of the earth in a day and thereby learn of other cultures while on their own turf. And then we hooked ourselves up to each other in a world of instantaneous communication, which has been a whole lot of fun. But we didn't factor in the cost of all this bounty as we built modern civilization. We didn't understand that running the world on fossil fuels that were needed for our machinery—our cars, planes, cargo ships, tankers, electric grids, and just about everything—would someday do us in. Nearly all of us went along on the ride and enjoyed the benefits, and now the party's over and the bill has come due. But where can we lay blame?

As theoretical physicist Peter Russell mused in a podcast conversation with me in 2016, "What if we saw ourselves as a cosmic flame blooming in the universe and coming to its natural end?"

What if we forgave everybody everything?

GRIEF

We grieve because we love. To the degree that your heart is shattered over loss is precisely the degree to which you loved that which has gone. We know that coming to terms with one's own personal death or the death of a loved one can lead to acceptance, Kubler-Ross's final stage of grief. There are countless examples of that final reckoning in which a dying person lets go of the last threads that tether him or her to this world–and dies at peace. I personally know dozens of people who have passed in this way. And we also know of many cases where people have managed to accept the death of a loved one and move on in their own lives, often with greater appreciation for those who are still here.

However, witnessing the death of all of life, even though there may be acceptance of the fact of it and even though one may no longer blame anyone or anything, comes with a different kind of grief. It is depressing on a scale that is unique to our time. Even as a child, I felt that the most horrifying movies were the ones about the end of all life on the planet. Now those images are playing in our heads as a real possibility, and people are feeling

beaten down by them. All the world over, there are waves of distress, anxiety, and depression, which are based on circumstance and not merely on brain chemistry gone awry. Distress, anxiety, and depression are appropriate responses in facing the threat of full extinction.

No matter how clear and rational our understanding of the situation, many of my extinction-aware friends admit that the magnitude of the loss we are undergoing is unacceptable to the innermost psyche. It might be akin to a parent losing a young child. Even when there was no one to blame and no story of "if only," the sorrow can rarely be fully overcome. Only this time, it is all the little children. All the animals. All the plants. All the ice.

Many of us are also in anticipatory grief; that is, in the period leading to full extinction, we are aware of how hard it will be for those who are already living marginally, such as the nearly one billion people who are now under nourished and who must search for food each day. These numbers will increase and food and fresh water will become impossible to find. Even here in a rich country, I know many people who live month to month, barely making the rent, foregoing all but the most basic necessities. They are considered the poor in our rich countries, and they are also growing in number. In the United States alone, many of those who were formerly middle class now live in their cars or in homeless shelters or on the streets. Even those in situations of abundance are often relying on jobs that are destined to disappear or on bank accounts and investments that will likely disappear as well. After all, much of the so-called wealth of the privileged is simply numerical digits floating on cyber screens. Those numbers changed in a single day during the Global Financial Crisis of 2008. One day a portfolio balance flickered one number on the screen; the next day it flickered a number that was far less.

You may begin to experience anticipatory grief for everyone—the animals, the young, the poor, the newly poor, the middle class, the rich, and, most of all, your own loved ones. Few people are even minimally prepared, emotionally or physically, for what is coming, perhaps especially those who are most privileged. A friend told me the following story: his father was a survivor of one of the Nazi concentration camps. He said that the people who had the best chance of survival in the camps were the ones who had come from poverty and hardship in their lives before the camps. Those who had come from privilege were the first to die.

I am aware that virtually no one in my family and few of my friends are either ready to hear

this information now or will be prepared to face what is ahead in time. It is pointless to try to warn them if they are not ready. My attempts at hinting usually lead to blank stares or agitation. I have come to accept that for some people, their fate is to continue the romp of life, oblivious to the dangers ahead. Maybe it is best that they enjoy whatever good times are left, even though there might be extreme panic in the last phase. Maybe it is just as well that they continue as they have been for as long as possible. Maybe it will postpone chaos and lawlessness the world over until the systems fully crash. But for those of us who cannot look away, we carry the anticipatory grief for those who cannot bear to look.

Award-winning climate journalist Dahr Jamail (whose articles on Truthout.org are the most comprehensive overviews and compilations on various forms of climate disruption that I have come across) knows well the process of grief in watching earth changes before his very eyes. A long time mountain climber, he has observed the permanent retreat of countless glaciers in Alaska, the Pacific Northwest, and elsewhere, having known those regions when the glaciers were still in full.

In the final chapter of his excellent book *The End of Ice: Bearing Witness and Finding Meaning in the Path of Climate Destruction,*" he writes: "Each time another scientific study is released showing yet another acceleration of the loss of ice atop the Arctic Ocean, or sea level rise projections are stepped up yet again, or news of another species that has gone extinct is announced, my heart breaks for what we have done and are doing to the planet. I grieve, yet this ongoing process has become more like peeling back the layers of an onion—there is always more work to do, as the crisis we have created for ourselves continues to unfold. And somewhere along the line I surrendered my attachment to any results that might stem from my work. I am hope-free."

I recently interviewed Dahr on the question of hope with regard to the many non-harmful or natural geo-engineering projects of mitigation and drawdown of carbon that are underway, unlike the aforementioned scary ones. These include planting trees, enriching soil, using particular forms of effective seaweed for carbon capture, solar farms, onshore wind turbines, plant-rich diets, and educating girls (educated girls have fewer babies), to name a few. But Dahr is wary about the timeline of these proposals.

"Hope is about the future and gives us a sense that we have more time when, in fact, we are out of time. I think it is awesome that people are doing things to mitigate the damage as it is the right thing to do. Some of us feel morally obliged to take action in those ways. On the

other hand, when you look at the amount of carbon that needs to be drawn down and how fast that has to happen, it is a physical impossibility to scale that to the level we would need.

"Take, for instance, wide-scale rejuvenation of soil. If every farmer were incentivized and mandated to incorporate practices that would rejuvenate soil at world scale and we coupled that with wide-scale tree planting—of course, all of these things take time–at least we would have set in motion some actions that might still help. What makes natural geo-engineering, soil sequestration, planting trees, and so on impossible for actually turning the tide on this is that there is a near total lack of political will to mandate any of it. If all of a sudden we could replace the horrible governments with functional ones that represented what we now need and if that is where all the funding went, yeah, it might actually make a dent in mitigation. But the reality is that there is not one country that I know of doing everything it can in that direction. Certainly none of the major emitters–Russia, the US, China, and India–are doing anything of significance; all four are just stomping on the gas. There is nothing to indicate that a change of course will happen. Nothing. Not now. Not next year. Not in ten years. So the lack of political will is going to negate any and all natural geo-engineering efforts.

"Nevertheless, we are still obliged to do what we can in our own ways, even if there is no chance for long-term mitigation. I was talking with a friend before I finished my book, and I said to him, 'Why even write this book?' And my friend said, "You know, Dahr, if the total outcome of your book buys one little organism in the Amazon one more week of life, then it is completely worth it.'"

Yet, we are often told that we cannot carry on without hope for at least a *someday* outcome. Because our western cultures, particularly those in America, are fixated on an almost childish adherence to hope, they celebrate old clichés such as, "You gotta have hope," "Don't lose hope, "Keep hope alive." Politicians and CEOs get elected with such slogans. Activists get funds for their projects and ideas even though they are five decades too late. And religious and new age thought leaders make millions peddling spiritual *hopium*, self-induced intoxication that ignores reality and offers an illusion of control or escape. True, there are times and places for hope when it is possible to change a course that can be changed. But clinging to hope when there is no longer anything to be done, when the course cannot be changed, makes hope itself a burden. One is forced into internal pretense, deeper denial. For people who have limited capacity for denial, and I suspect that

if you have read this far you are one of those, maintaining hope becomes impossible. It is a surprising relief to let go of it.

However, you may then experience the brunt force of sorrow. Grief, straight up. It may sneak into your dreams. It may come in ordinary moments such as smelling the spray of an orange; or when a child whom you love says the words, “When I grow up…” It may come when you observe greed, ignorance, and cruelty, as these are reminders of why the world is dying. Sometimes you may feel you could cry and never stop crying.

To stay steady, you may be forced into a witnessing presence, vast enough to contain your grief. You may acclimate to living with grief without the assumption that it should or will dissipate. Despite this or because of it, you may notice a growing tendency to appreciate simple moments of connection and many small joys. And you may feel more awake than you have for a long time.

Living with the grief of facing human extinction may be akin to how a person with a terminal diagnosis might experience his or her final phase, the awareness of death undeniable, and the magnificence of life ever more obvious.

LOVE

So come my friends, be not afraid
We are so lightly here
It is in love that we are made
In love, we disappear
—Leonard Cohen
“Boogie Street”

What else is there to do now? Here we are, some of the last humans who will experience this beautiful planet since Homo sapiens began their journey some 200,000 years ago. Now, in facing extinction of our species, you may wonder if there is any point in going on. If your future projects make no sense any more, if you feel it is unwise to have children, and that things are going to get really hard and bad, you may not want to bother living any longer. Yet, there are other ways to use your attention that make life still relevant and even beautiful.

For nearly thirty years I have led public sessions and silent retreats around the world. In those gatherings, I encourage people to manage their own attention by moving it into present awareness, gratitude, and an immersion in the senses. However you are using your attention in any given moment is conditioning the experience you are having in that moment. We live in a time when managing our attention will be all the more necessary to stay calm and to allow us to enjoy and be helpful in whatever time is left. Directing attention is a facility that becomes habitual with time. Left to its own conditioned patterns, our minds get into all kinds of trouble (unless one was very lucky in one's conditioning, which is rare). Developing the habit of re-directing your awareness when your mind is lost in fear or troubling stories induces confidence along the way. Your attention starts to incline toward ease more frequently. You find that you can choose calm. You can choose gratitude. You can choose love.

Jonathan Franzen, winner of the National Book Award and many other literary honors, writes in his latest book *The End of the End of the Earth*: "Even in a world of dying, new loves continue to be born." This is now the time to give yourself over to what you love, perhaps in new and deeper ways. Your family and friends, your animal friends, the plants around you, even if that means just the little sprouts that push their way through the sidewalk in your city, the feeling of a breeze on your skin, the taste of food, the refreshment of water, or the thousands of little things that make up your world and which are your own unique treasures and pleasures. Make your moments sparkle within the experience of your own senses, and direct your attention to anything that gladdens your heart. Live your bucket list now.

There are also some simple thought reflections and actions that might be helpful:

Find your community (or create one). People are beginning to wake up and speak about this all over the world. A new group called Extinction Rebellion, which began in the U.K., now has gatherings in many cities of Europe, North America, and Australia. They may be able to connect you with people in your area. There are also several online extinction-aware groups. You may want to start discussions in your own home with friends and neighbors. People have been thinking about these matters and discussing issues such as community gardens, water, and safety—and there is a lot of online information along those lines. Having community around you is important both for mental wellbeing and for what Jem Bendell explains in his excellent online paper, Deep Adaptation: A Map for Navigating

Climate Strategy. Take a look also at Dahr Jamail's blog posts Truthout.org where you will find dozens of up-to-date climate articles as well as his new blog series (co-written with Barbara Cecil) called "How Then Shall We Live?"

Find your calm. In addition to wisely directing your attention,include also whatever daily activities induce greater calm in your life–walking in nature, a slow meal with loved ones or on your own, reading or listening to music, dancing, swimming–whatever your thing is, give priority to it every day. Your relaxation and calm is not an indulgence but rather a tune up for your mental and physical wellbeing, which leads to a more awake and responsive intelligence.

Release dark visions of the future, and pace your intake of climate news. Although frightening pictures about what is to come in the future may arise in your imagination, it is best not to entertain them. It is also helpful to pace yourself in reading or watching news of climate chaos. There is a tendency, once climate catastrophe grabs the attention, to keep staring at fresh news of it as though transfixed by a plane crash in real time. Resist being constantly immersed in the increasing data of the chaos. Have a fast from the news as needed, and rest your weary mind. My friend Dahr periodically unplugs and walks in mountains; my friend Mark unplugs and works for hours in his garden. They are both intently aware of unfolding climate realities, with the inevitable sadness that comes with that awareness. Yet both have learned to manage and enjoy the precious time that is left, living by a Navaho ethos: "May you walk in beauty."

Be of service. Know that whatever is to be in the future, it will feel good to be of service in whatever ways your gifts can be used and on any scale that feels right and true, whether in your personal life of family and friends or in a larger community. There is no need to keep accounts of whether your actions will someday pay off. Being of service feels good for its own sake and gives your life meaning, a sense that you are being well used, like good compost in the field of life.

Be grateful. Longevity was never a guarantee for anyone at any time of history. Whatever time is left to us, we are the lucky ones. We got to experience life, despite the overwhelming odds of that not being the case, as biologist Richard Dawkins often points out. When we think of all the times our ancestors had to thread the needle of survival and live long enough to procreate, *every single lifetime*, it puts into perspective how precious is this experience we are having. Gratitude for life itself becomes the appropriate response.

Direct your awareness many times throughout the day to all the little things for which you are grateful. It is an open secret for inducing a calmer mind.

Give up the fight with evolution. It wins. The story about a human misstep in history, the imaginary point at which we could have taken a different route, is a pointless mental exercise. Our evolution is based on quintillions of earth motions, incremental biological adaptations, survival necessities, and human desires. We are right where we were headed all along.

Despite our having caused so much destruction, it is important to also consider the wide spectrum of possibilities that make up a human life. Yes, on one end of that spectrum is greed, cruelty, and ignorance; on the other end is kindness, compassion, and wisdom. We are imbued with great creativity, brilliant communication, and extraordinary appreciation of and talent for music and other forms of art. We cry in tenderness when we are touched by love, beauty, or loss. We cry in empathy for others' pain. Some of us even sacrifice our lives for strangers. There is no other known creature whose spectrum of consciousness is as wide and varied as our own.

You likely know well the spectrum of human consciousness within yourself. Perhaps you have had many moments when greed or hatred overtook your mind. But it is likely you have also had many moments when you knew that love was all that ever really mattered. And in your final breaths it is likely to be all that is left of you, a cosmic story whispered only once.

As Leonard said, "It is in love that we are made; in love we disappear."

—Catherine Ingram
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