

F I R S T F I R E
The Earth, the human presence, and the future

ONCE, MARGARET FULLER—Emerson’s friend and, for awhile, editor of his journal *The Dial*—took a trip to Niagara Falls, a trip she described thus:

Just as I had seated myself [at Table Rock, close to the great fall], a man came to take his first look. He walked close up to the fall, and, after looking at it a moment, with an air as if thinking how he could best appropriate it to his own use, he spat into it.

“This trait,” she went on, “seemed wholly worthy of an age whose love of utility” is so extreme.¹

BY JUNE 2010, CONCENTRATION of atmospheric carbon dioxide (CO₂) had reached 392 parts per million. That is 5.5 percent over what it was in 2000 and 10.1 percent over 1990. The quantity of CO₂ thrown into the atmosphere in 2010—30.6 billion metric tons—exceeded all previous years, despite the faltering economy.² In May 2011 it hit 394.97 ppm.³

THOMAS BERRY WAS ONCE A ROMAN CATHOLIC priest, but came to call himself a Geologian. He was a prophetic voice whose impact on me is matched by his impact on an awful lot of others who have come to

- 1 *Summer on the Lakes*, Ch. 1 (entry for Niagara, June 10, 1843). In *The Portable Margaret Fuller*, ed. Mary Kelley. New York: Penguin, 1994, pp. 71f.
- 2 Andrew C. Revkin, “Tracking economy, CO₂ emissions hit new high.” *New York Times* Dot Earth blog, 30 May, 2011.
- 3 John Vidal, “Carbon levels hit new peak, research shows.” *The Guardian*, 31 May 2011. You can track the latest readings at <http://esrl.noaa.gov/gmd/ccgg/trends/>.

an edge where the exhausted thinking of previous eras collapses. For decades Thomas Berry had been telling us that the planet as a whole is in a traumatized state. These are his words: “We are in a situation beyond anything ever experienced before in the course of human or earth history.”

Never has there been anything like the first years of the new millennium, when the ink on one urgent scientific report is barely dry when another, more ominous, more appalling, is issued.

We would be right to tremble.

IN JANUARY 2005, A MAJOR international report called *Meeting the Climate Challenge* became only one more in a succession of reports coming from thousands of scientists around the world—one of them even commissioned by the Pentagon but then suppressed by the Bush administration—to warn of apocalyptic consequences of climate change that are already beginning to show up. And extremely comprehensive computer analysis done on supercomputers at the Commerce Department’s lab in Princeton, New Jersey warned in September 2004 that hurricanes would become stronger, wetter, and more frequent because of global warming.

The week before Katrina, the then U.N. Ambassador, John Bolton, demanded that all references to the battle against global warming be removed from the new statement of the ideals and purposes of the United Nations. America’s senior climate change scientists were being investigated and bullied by the chair, then, of the House Committee on Energy and Commerce—Joe Barton of Texas, who has long ties with the fossil-fuel industry.⁴

IF YOU GET YOUR NEWS FROM the European press and not the American—or you follow the alternative press in the U.S.—you may have learned about a stunning Pentagon report issued in November 2003 and suppressed by the Bush White House for four months until the

⁴ Paul Brown. “Republicans accused of witch-hunt against climate change scientists.” *The Guardian*, August 30, 2005.

*Observer*⁵ of London and, of all things, *Fortune* Magazine got hold of it. A *Pentagon* report! And it calls climate change during the next twenty years a greater threat to national security than terrorism.

It says the worst advances of climate change will come abruptly, not gradually, finally inundating London, New York, Boston, Miami, Bombay, Calcutta, Sydney, Shanghai, Lagos and Tokyo, and submerging them under rising seas. And this report says it would leave six billion people on an overburdened planet in a state of perpetual war contending for vanishing supplies of energy, water, and food as catastrophic shortages would also mean mass migrations, famine, and disease. It's especially astounding because it was commissioned by the revered defense advisor who was the mastermind behind some of Donald Rumsfeld's favorite schemes. Oops.

And it wasn't the only warning. Similar reports have come from the German government, whose scientists came to almost exactly the same conclusions, and by British scientists, and by the Intergovernmental Panel on Climate Change, and by many American scientists.

A quarter of all land species, maybe a lot more, will go extinct in the process.

At an international conference of 114 governments, in January 2005, the then chair of the Intergovernmental Panel on Climate Change, Dr Rajendra Pachauri—said he personally believes that the world has “already reached the level of dangerous concentrations of carbon dioxide in the atmosphere” and he said there must be immediate and “very deep” cuts in the pollution if humanity is to “survive.” That's his word. The American government was shocked.

This is why the Administration was shocked. The White House had gotten the previous chair, Dr. Robert Watson, *removed*—at the request of ExxonMobil, because he persisted in calling for urgent action. They wanted him replaced by Dr. Pachauri—and so the Bush Administration lobbied other countries to vote Watson out and Pachauri in.

So here's the new guy, the one Exxon and the Bush White House wanted, and he tells the delegates: “Climate change is for real. We have

5 *The Observer*, London, Sunday February 22, 2004.

just a small window of opportunity and it is closing rather rapidly. There is not a moment to lose.”⁶ Later he said that the danger point the IPCC had been set up to prevent us reaching—*had already been reached*.

In February 2005, Tony Blair convened two hundred of the world’s leading climate scientists at Exeter, in the south of England. They issued the most urgent warning to date.

Writing in *The Independent* of London, environment editor Geoffrey Lean mused:

Future historians, looking back from a much less hospitable world, will certainly pay special attention to the first few weeks of 2005. They will puzzle over how a whole generation could have sleepwalked into disaster—destroying the climate that has allowed human civilisation to flourish over the past 11,000 years—and they may well identify the first weeks of this year as the time when the last alarms sounded.⁷

IT ALL CAME TOGETHER AT EXETER. The conference had been called by the Prime Minister to advise him on the urgent steps that would have to be taken. He needed help persuading the world to act.

It opened with his Secretary of State for the Environment, Margaret Beckett, saying that “a significant impact” from global warming “is already inevitable.”⁸

There were presentations from top scientists and economists from every continent showing that dangerous climate change is already happening and that catastrophic events that were once thought *highly improbable* were now seen as *likely*. Avoiding the worst would be technically simple, and cheap, they said, provided that governments could be persuaded to take immediate action.

As Lean reports, the conference learned that glaciers are shrinking. Arctic sea ice has lost almost half its thickness and will disappear

6 “Pachauri: Climate approaching point of ‘no return.’” *The Independent*, 23 January 2005.

7 Geoffrey Lean. “Sleepwalking toward apocalypse now.” *The Independent*, 6 February 2005

8 Geoffrey Lean, *op cit*.

altogether by 2070. By 2075, most of the glaciers on the Swiss Alps will be gone. The director of the British *Antarctic* Survey showed that the West Antarctic ice sheet is beginning to melt, which could mean a rise in sea levels of fifteen feet: which is something when you consider that 90 percent of the world's people live near sea level.

They learned more things:

There are now far more natural disasters caused by violent weather.

The bird populations in the North Sea has collapsed. Maybe a quarter of the world's coral reefs are already gone.

There is powerful evidence that the oceans are slowly turning acidic.

There is a new scientific consensus—that the warming *must be kept below an average increase of two degrees celsius (3.6F) if catastrophe is to be avoided*. Some are convinced that a single degree celsius is all the planet can bear; others argue that processes already in motion render that small an increase impossible. Concentrations of carbon dioxide, the main cause of climate change, must be gotten below 350 parts per million and kept there. But we've already reached 394.97 ppm.

In October 2006, the British Government issued The Stern Report—authored by former World Bank chief economist Sir Nicholas Stern. It paints an apocalyptic picture over 700 pages of where global warming could lead economically, arguing that, unless we act, it will cost more than two world wars and the Great Depression of the Thirties and render swaths of the planet uninhabitable. Even if the world stopped all pollution tomorrow, the slow-growing effects of carbon already pumped into the atmosphere would mean continued climate change for another thirty years and sea levels rising for a century. (More recent science says much longer, like a 2009 NOAA (the federal National Oceanic and Atmospheric Administration) study directed by scientist Susan Solomon that says sea rise, changes in precipitation, and surface temperature will continue for *a thousand years*.⁹) Nor, wrote Dr. Stern, is unilateral action by one country enough: if Britain closed all its power stations tomorrow, within thirteen months China would

9 “New Study Shows Climate Change Largely Irreversible,” press release from National Oceanic and Atmospheric Administration, 26 January 2009, at www.noaa.gov/stories2009/20090126_climate.html.

fill the gap left in global emissions. Given that the effects will be felt around the world—from the collapse of the Amazonian rainforest to the melting of Greenland’s ice sheet and changes in the Indian monsoon—the response must be global, too. But in April 2008, Lord Stern had to tell the *Financial Times* “We underestimated the risks . . . we underestimated the damage associated with temperature increases . . . and we underestimated the probabilities of temperature increases.” In retrospect, he said, he would have taken a much stronger view in the report on the drastic changes that would come about if greenhouse gas emissions were not abated.

THE BIG QUESTION IS WHETHER governments will act. Or will our children and grandchildren wonder—“how could they have been so blind?”

I WAS STRUCK BY WHAT the *Independent* correspondent Lean, who reported the Exeter conference, wrote about his experience:

I am willing to bet there were few in the room who did not sense their children or grandchildren standing invisibly at their shoulders. . . . The cautious scientific language scarcely does justice to the sense of the meeting.¹⁰

Then the biggest study of climate change ever made, based at Oxford University, said that what we’re headed for will be twice as catastrophic as the IPCC’s worst predictions. Then an international task force reported that we could reach “the point of no return” in a decade.

And then, just before *Shell Oil* reported record profits mainly achieved by selling oil, the head of Shell in the UK, Lord Oxburgh, warned that without urgent action by the governments of the world, there “will be a disaster.”¹¹

What could happen?

Wars could break out over diminishing water resources as popula-

10 Geoffrey Lean, *op cit.*

11 Saeed Shah. “Shell boss warns of global warming ‘disaster.’ *The Independent*, 26 January 2005.

tions grow and rains fail. Not today's seven billion, but more than 10 billion, will be competing for water, and food, and habitable space by 2050 (and 9.3 billion by 2100), according to United Nations Population Division.¹²

What could happen? London, New York, Tokyo, Bombay, many other cities and vast areas of countries from Britain to Bangladesh disappear under many feet of water as seas rise. The EPA says that by century's end it will only take a storm to flood Boston—and all the way to Duxbury would be under water.

How likely is it? Inevitable. Even if global warming stopped today, the seas would continue to rise for centuries.

Even the United States Energy Information Administration during the Bush years said that world demand for all forms of energy will rise 54 percent in the next 20 years.¹³ We can hope that a combination of subsequent conservation and technology progress will mean a smaller increase, because if the tide isn't turned, by 2025, the world will use twice as much electricity and 50 percent more oil.

But—here is what we're letting our corporations get away with.

Carbon dioxide is one of the principal greenhouse gases that cause all this. An unusually candid executive at ExxonMobil says his company expects CO₂ levels to rise 50 percent by 2020.

But there was a handy solution. In 2003 the Bush Administration's EPA proclaimed that CO₂ and those other greenhouse gases—are *not pollutants* and so they don't have to be regulated.

The greenhouse gases *aren't pollutants?! Handy*. So the major carmakers—Ford, GM, Toyota, BMW, Porsche, Volkswagen, DaimlerChrysler, Mazda, Mitsubishi, and Nissan and Honda—in order to defeat a new set of regulations in California—launched a TV and print ad campaign declaring their vehicles “virtually emission-free.” The auto makers' alliance explained that the term “virtually emission-free” should be understood to refer only to emissions classified as pollutants

12 Justin Gillis and Celia W. Duggar, “U.N. forecasts 10.1 billion people by century's end.” *New York Times*, 3 May 2011.

13 “EIA: Global oil use seen soaring.” Reuters, April 15, 2004.

by the Environmental Protection Agency.¹⁴ Finally, at the end of 2009, the Obama Environmental Protection Agency ruled CO₂ a “dangerous” threat to public health, giving the agency regulatory power of emitters. Or maybe not “finally”: on April 7, 2011, the House of Representatives—since the 2010 election under the control of the Republican Party now driven by the far-right “Tea Party” movement—voted to bar the EPA from regulating CO₂ and industrial emissions. Fortunately, there weren’t enough votes in the Senate, which would have to override a presidential veto.

NO WONDER DR PACHAURI concluded: “We are risking the ability of the human race to survive.”

The American Geophysical Union added its voice to the chorus in January 2008, saying “Earth’s climate is now clearly out of balance and is warming.” Then on February 1 the Scripps Institute of Oceanography published, in *Science*, its conclusion that the persistent and dramatic decline in mountain snowpack in the American West comes down to the amount of carbon we’re putting in the atmosphere, producing an even drier, more arid West. In the same issue, a group of fifty scientists predicted a series of sudden shifts:

- Melting of Arctic sea-ice (about 10 years)
- Decay of the Greenland ice sheet (about 300 years)
- Collapse of the West Antarctic ice sheet (about 300 years)
- Collapse of the Atlantic thermohaline circulation (about 100 years)
- Increase in the El Nino Southern Oscillation (about 100 years)
- Collapse of the Indian summer monsoon (about 1 year)
- Greening of the Sahara/Sahel and disruption of the West African monsoon (about 10 years)
- Dieback of the Amazon rainforest (about 50 years)
- Dieback of the Boreal Forest (about 50 years)

Subsequent science has produced only starkly more alarming projections. As I write, AMAP—the international Arctic Monitoring and Assessment Program—is reporting the Arctic ice sheets melting three

14 Danny Hakim, “An auto industry ad leaves critics choking.” *New York Times*, March 22, 2005.

times faster than previously thought—so much faster that a three to five foot sea level rise will result from this factor alone by 2100. Meanwhile we're learning that some mountain glaciers are melting a hundred times faster than at any time in the past 350 years. In Patagonia in South America the lost ice is already equivalent to 120 percent of the contents of Lake Erie. Most of the loss has happened within thirty years. Around the world, mountain glaciers are the source of water that billions of people rely on for crop irrigation and water supplies. As the melting deprives the planet's farmlands and thirsty inhabitants of water, it has begun raising sea levels.¹⁵

The prediction of ice sheet melting and resultant effect on ocean circulation was borne out by scientists' discovery in 2011 of a massive volume of freshwater floating on the Arctic Ocean like a cap. If this result of melting sea ice flows into the North Atlantic, it could affect the complex "thermohaline" ocean circulation that keeps the warm Gulf Stream flowing toward Britain and keeps Britain temperate.

The warnings from the Geophysical Union and the Scripps Institute in early 2008 were followed immediately by a warning from an international scientific team from the National Academy of Sciences, the Potsdam Institute for Climate Impact Research in Germany, the University of East Anglia, and Oxford University's Environmental Change Institute, ranking the most vulnerable regions on the planet and warning of sudden and catastrophic collapse before the end of the century. They warn of thresholds beyond which ecosystems will enter abrupt decline. There's already a fifty percent chance that the Greenland ice sheet will begin melting irreversibly, which alone would lead eventually to a 23-foot rise in sea levels. The warming would bring droughts and floods first.

In March 2008 James Hansen, head of NASA's Goddard Institute for Space Studies, said the EU target of 550 parts per million of CO₂—then the most stringent in the world—must be slashed to 350 ppm if

15 Charles J. Hanley and Karl Ritter, "As Greenland melts faster into sea, researchers forecast up to 5-foot rise in ocean levels." Associated Press, 3 May 2011; Lewis Smith, "Glaciers melting at fastest rate in 350 years, study finds." *The Independent*, 4 April 2011.

“humanity wishes to preserve a planet similar to that on which civilisation developed.” Hansen is one of the genuine heroes in the climate emergency. That’s the same Hansen whom the Bush Administration had sought to silence when, studying the data, he connected the dots. He knew how the Bush Administration was manipulating (and squelching) scientific data. He tried to go public, citing as grounds for doing so the first line of NASA’s mission statement: “to understand and protect our home planet.” The statement had come out of an extensive, participatory process at NASA. In 2006, Hansen discovered that the statement had disappeared from the NASA web site and had somehow been revoked.¹⁶ Simultaneously, the budget for earth sciences was mysteriously slashed.

But conference after scientific conference, study after study, warns of a situation more appalling than the last conference or study. The Intergovernmental Panel on Climate Change regularly draws together thousands of scientists representing most nations on earth, organized by the United Nations. Its landmark report in February 2007 contained stark warnings that even now seem mild. We know a lot more now.

In it, there is a list of tipping points that we’re approaching at breathtaking speed. We know that the Arctic sea ice and the Greenland ice sheet are in danger of sudden catastrophic collapse and it may already be too late to save them and prevent the catastrophic rise in sea levels that would result.

In March 2009, something happened that you may not have noticed because the American media chose to ignore it. At Copenhagen, an Emergency Climate Summit, in preparation for the international climate conference there the following December ended with desperate pleas from the scientists.

Two thousand five hundred scientists from eighty countries came to reveal more terrifyingly stark facts and projections than even the worst previously made public. You wouldn’t have read about it in the *Chicago Tribune* or the *Orlando Sentinel* or even the *New York Times*. You could find it on the front pages of the better British newspapers not owned by

¹⁶ James Hansen, *Storms of My Grandchildren: The Truth About the Coming Climate Catastrophe and Our Last Chance to Save Humanity*. New York, Berlin, London: Bloomsbury, 2009, pp. 124-135.

Murdoch's News International, or on the BBC,¹⁷ but Americans remain uncomprehending, thanks, inexplicably, to our media.

Sir Nicholas Stern, the economist commissioned by the British government to analyze the economic impact of climate change, told the summit that politicians have failed to take on board the severe consequences of failing to cut carbon emissions, and that the consequences will be “devastating.” His words: “Do the politicians understand just how difficult it could be? Just how devastating four, five, six degrees centigrade would be? I think not yet.”

Why the urgency? Back in the 1990s, carbon emissions were rising by 0.9 percent—less than one percent—a year (averaging about 1.5 percent per year between 1973 and 2000). That represented real progress, since the growth rate of emissions from 1950 to 1973 was 4.5 percent. But the growth rate is again approaching that of the pre-environmental 1950-1973 era. It now stands at about *3.5 percent every year*. Rapidly increasing regression to burning *coal* has a lot to do with that. So much for the optimistic projections that greenhouse gas emissions would be dropping by now.

The scientists at Copenhagen in March 2009 said carbon emissions have risen more in recent years than *anyone thought possible*, and the earth seems to be losing the ability to soak it up. And they said that failure to agree strong carbon reduction targets at political negotiations this year could bring “abrupt or irreversible” shifts in climate that would render parts of China, India and the eastern United States uninhabitably hot.

17 Indeed, *The Guardian* and *The Independent* are a major source for most of this section: David Adam, “Stern attacks politicians over climate ‘devastation.’” *The Guardian*, 13 March 2009; Michael McCarthy, “Lord Stern on global warming: It’s even worse than I thought,” *The Independent*, 13 March 2009; Randolph E. Schmid, “Global warming increasing faster than predicted.” *Huffington Post*, 14 February 2009; David Adam, “Severe global warming will render half of world’s inhabited areas unlivable, expert warns,” *The Guardian*, 12 March 2009; David Adam, “Global warming may trigger carbon ‘time bomb’, scientist warns,” *The Guardian*, 10 March 2009; Michael McCarthy, “Fate of the rain forest is ‘irreversible,’” *The Independent*, 12 March 2009; David Adam, “Amazon could shrink by 85% due to climate change, scientists say,” *The Guardian*, 11 March 2009; Katherine Richardson, “A kick-start in Copenhagen: The picture scientists laid out at our climate summit is bleak, but the research paves the way for action,” *The Guardian*, 13 March 2009; Robin McKie, “President ‘has four years to save earth’; US must take the lead to avert eco-disaster,” *The Observer* (Sunday edition of *The Guardian*), 18 January 2009.

Uninhabitably hot.

- Sea levels will rise twice as fast as official predictions we have now.
- Even modest warming could unleash a carbon “time bomb” coming from the Arctic soils. In fact, permafrost in the Arctic—and elsewhere—holds massive, frozen stores of methane, billions of tons of it, in boggy soils which, when they melt, release this most potent of greenhouse gases, twenty-five times more potent than CO₂ over a time horizon of a century, and as much as seventy-two times more potent over twenty years. In the Arctic, warming is proceeding twice as fast as anywhere else. Methane emissions have risen by almost one-third in five years’ time. The problem is particularly severe under the East Siberian portion of the Arctic Ocean seafloor. The permafrost there, long thought to be an impermeable barrier sealing the methane in, is perforated by melting and leaking large amounts of methane into the atmosphere—in fact, as much methane is coming from the East Siberian Arctic seafloor as is coming from all the rest of the world’s oceans.¹⁸

- The rising temperatures will almost certainly kill off half of the Amazon rainforest—it’s too late to reverse that—and could kill off 85 percent of it.

- It turns out that ocean temperature is rising about 50 percent faster than anybody predicted.

It had been pretty well agreed that we cannot allow temperatures to rise more than 2° C—which is 3.6° F. But the experts at Copenhagen warned that temperatures are probably going to soar beyond that 2° C target. One of them said what they’re now thinking: “The 2° C target is gone . . . I think we’re heading for 4° C at least.” Not a few scientists think it’s going to 7° C. Four degrees celsius is 7.2° F. Seven is 12.6° F. What will that mean?

If things go poorly, scientists now think a 4° C rise could come as

18 David Adam, “Arctic permafrost leaking methane at record levels, figures show,” *The Guardian*, 14 January 2010. National Science Foundation press release “Methane releases from Arctic shelf may be much larger and faster than anticipated,” 4 March 2010, at http://www.nsf.gov/news/news_summ.jsp?cntn_id=116532&org=NSF&from=news. Judith Burns, “Methane seeps from Arctic sea bed,” BBC News, 4 March 2010. Cornelia Dean, “Study says undersea release of methane is under way,” *New York Times*, 4 March 2010.

soon as 2060.¹⁹

- A 4° C rise could turn swaths of southern Europe to desert.
- And that other stunner: it could render half of the world so hot as to be uninhabitable. That includes the Eastern United States.

All the messages coming in are telling us that the climate system is operating on the worst-case scenario.

Scientists usually avoid commenting directly on policy, but the scientists at Copenhagen had had enough of silence. They insisted politicians have got to stand up to “vested interests that increase emissions” and “build on a growing public desire for governments to act.” They called for a “shift from ineffective governance and weak institutions to innovative leadership in government, the private sector and civil society.”

Rob Bailey, the senior climate adviser for Oxfam said: “The verdict of the world’s top scientists is clear. The big question now is whether the world’s richest countries, who created the climate crisis, will act before it’s too late. Our climate is changing fast and if left unchecked its impacts, particularly on the world’s poorest people, will be devastating.”

Another of the scientists, Kevin Anderson, who’s the research director at the Tyndall Centre for Climate Change Research in the UK, said: “The scientists have lost patience with our carefully constructed messages being lost in the political noise. And we are now prepared to stand up and say enough is enough.”

When President Obama took office, he got a message from James Hansen. His message: We now have only four years to save the earth, or the processes already set in motion will be unstoppable. Two years later, in 2010, a “Tea Party” -driven right wing surge put Republicans decisively in control of the House of Representatives and left Democrats with a thin hold on the Senate. This brought new influence to Darrell Issa, a California Republican who got the chair of the House Oversight Committee. He was planning investigations of—*climate scientists*. His

¹⁹ Richard A. Betts, Matthew Collins, Deborah L. Hemming, Chris D. Jones, Jason A. Lowe, Michael G. Sanderson, “When could global warming reach 4°C?” *Philosophical Transactions of The Royal Society* (London: Royal Society Publishing, 2 June 2011), at <http://rsta.royalsocietypublishing.org/content/369/1934/67.full>.

perspective is reflected in nearly every Republican in Congress. Illinois' John Shimkus, one of the contenders to chair the House Committee on Energy and Commerce, rejected scientists' warnings about climate change by simply quoting *Genesis* 8:22 —

As long as the earth endures, seedtime and harvest, cold and heat, summer and winter, day and night will never cease.

“I believe that’s the infallible Word of God,” he said. Discussion closed. And then there was good old Joe Barton, famous for his rejection of humanity’s contribution to warming, who hoped to regain that Energy Committee post, explaining that if the earth gets hot, people will just adapt and find shade.²⁰

In 2011, while his state was literally on fire—the result of the worst droughts ever recorded for Texas and the highest temperatures ever recorded for any American state led to wildfires that consumed the equivalent, in square miles, of Connecticut—Republican governor and presidential aspirant Rick Perry repeated his rejection of the science of global warming.

In her work of “space fiction” *Shikasta*, Doris Lessing writes as though from the perspective of a far future time, reflecting on the history of the Earth, describing a “Century of Destruction:”

These were maddened creatures, and the small voices that rose in protest were not enough to halt the processes that had been set in motion and were sustained by greed. By the lack of substance-of-we-feeling.²¹

Indeed. Today the scientists issue their increasingly urgent warnings, and the small voices that rise in protest are not yet enough to halt the processes that have been set in motion and are sustained by greed.

In December 2009, representatives of the 192 nations returned to Copenhagen to negotiate. European news media and alternative media in America covered the event closely; major U.S. media barely mentioned it. Largely because the United States Senate had failed to approve a serious proposal for international agreement and resistance

20 Elizabeth Kolbert, “Uncomfortable Climate.” *The New Yorker*, 22 November 2010.

21 Doris Lessing, *Re: Colonised Planet 5, Shikasta*. New York: Alfred A. Knopf, 1979, p. 90.

from Russia and China, the conference ended in fetid failure. President Obama went with a fake promise of a seventeen percent cut—fake because all other nations based their comparisons on 1990 emission levels. The American “seventeen percent” was a scam based on a comparison with 2005. When based on the same 1990 standard, America was really proposing a pathetic *four* percent cut. Europe’s intention of a 2050 fifty percent emissions cut commitment (Germany’s Merkel wanted eighty percent) that would be legally binding was shot down by the refusal of China and India to agree. Subterfuge, drama, and hard bargaining drew in President Obama, British Prime Minister Gordon Brown, France’s Sarkozy and Germany’s Merkel. Chinese president Jiabao contemptuously sent lower-level representatives in his place. That any agreement at all came out of Copenhagen owed to a heroic last-minute intervention by Ed Miliband, then the British environment minister and now leader of the Labour Party. All that remained was a vaguely worded two and a half page political agreement with no binding force and very little content. In sum, more than 100 heads of state agreed to limit the rise in global temperatures to 1.5°C – 2°C (2.7°F – 3.6°F) above the long-term average before the industrial revolution which set in motion the massive rise in greenhouse gases.²²

But six months later came the analysis of a major international effort led by the UN Secretariat to monitor the emissions reduction targets of over sixty countries, the Climate Interactive Scoreboard. Its conclusion: even if the agreed “promises” are kept, global temperatures will rise a catastrophic 3°C (5.4° F). And analysts at Climate Analytics, at the Potsdam Institute for Climate Impacts Research in Germany, concluded that whatever pledges were made at Copenhagen will fail to hold global warming below 2°C, and that, instead, 2020 will bring 3.5°C (6.3° F), and catastrophe. They expect to see global emissions rise between 10 and 20 percent by then. Further, even the specific promises aren’t being matched by real reductions.²³

22 John Vidal and Jonathan Watts, “Copenhagen: The Last-Ditch Drama That Saved the Deal from Collapse.” *Guardian*, 20 December 2009.

23 Survey of 1,546 adults, April 21-26 2010, reported in *The Smithsonian*, July-August 2010.

Meanwhile there are signs that the simultaneous corporate and fundamentalist propaganda campaign to undermine climate science is having an effect. In 2008, a Pew poll found more Americans believing in angels than in anthropogenic (human-caused) climate change. Only 30 percent of American voters saw climate change as a top national priority. Pew Research polls for the *Smithsonian* magazine showed 76 percent of Americans believing in 1999 that the earth will get warmer, but by 2010, that percentage had been reduced to a mere 66. And 47 percent actually believed that “the quality of the earth’s environment will improve” by 2050, damning evidence that major media had failed miserably to convey the bitter facts.²⁴

As I wrote a draft of this chapter, the mid-Atlantic region was deep in snow after a blizzard of historic proportions—actually two, all within a few days’ time. The Capital was shut down for days. For some, that’s proof enough that climate change is a liberal lie. The Oklahoma Republican climate change denier Sen. James Inhofe built an igloo on Capitol Hill with a cardboard sign reading “Al Gore’s New Home.”

But local weather—whether it’s snowing or sunny in your garden or what the weather’s been like this year in your state—establishes nothing. Although it must be noted that climate scientists had actually predicted more snowstorms in the Northeast as climate change brings more violent weather and more moisture in the atmosphere brings more precipitation.

Note, please, the distinction. *Weather* is not the same as *climate*. *Climate* is average weather conditions over time, and climate change refers to those conditions globally, not just in your state or your garden. Even as Washington and Baltimore and New York dug out, most of the world was hotter than it has ever been. By the time of this writing in 2010, seventeen nations have experienced the highest temperatures

24 Richard Black, “‘Paltry’ carbon curbs point to 3C,” *BBC News*, 21 April 2010. Potsdam Institute analysis published as “Copenhagen Accord pledges are paltry,” *Nature*, 22 April 2010. Article by Joeri Rogelj, Julia Nabel, Claudine Chen, William Hare, Kathleen Markmann, Malte Meinshausen, Michiel Schaeffer, Kirsten Macey & Niklas Höhne. Online at: <http://www.nature.com/nature/journal/v464/n7292/full/4641126a.html>. Juliette Jowit and Christine Ottery, “Studies predict major extinctions and collapse of Greenland ice sheet with temperatures rising well above UN targets,” *The Guardian*, 5 July 2010.

ever recorded.

Consider, then, the massive irresponsibility shown by political leaders who can't be bothered with the science. How would they explain the idiocy to future generations who must live—if they can—with the consequences?

PAST THE POINT OF NO RETURN?

The British scientist and Fellow of the Royal Society James Lovelock proposed his “Gaia hypothesis” in the early 1970s—asserting that Earth is a single living system that self-regulates so as to maintain conditions favorable to life, that human activity is altering it, that it's a complex system difficult to predict, that it holds “critical thresholds and abrupt changes,” and that it's now in trouble. For his efforts (along with colleague Lynn Margulis) he was awarded the Geological Society's very prestigious Wollaston Medal.

Now, a “hypothesis” is an untested idea proposed to explain the facts—not quite yet a “theory,” something that's been tested and found true. But his insistence that Earth is a living system, and is sick, is supported by mounting evidence. It's come to be known as “Gaia” or “Earth System” Science.

In January 2006, James Lovelock announced his conclusion that we have passed the point of no return, that the damage is now irreparable, and that we must now act to limit the scale of the coming catastrophe.²⁵

In *The Independent*, he wrote:

This article is the most difficult I have written . . . The climate centres around the world, which are the equivalent of the pathology lab of a hospital, have reported the Earth's physical condition, and the climate specialists see it as seriously ill, and soon to pass into a morbid fever that may last as long as 100,000 years. I have to tell you, as members of the Earth's family and an intimate part of it, that you and especially civilisation are in grave danger.

Before the industrial revolution, the concentration of carbon dioxide in the atmosphere stood at about 280 parts per million; now it's above

²⁵ James Lovelock, “The Earth is about to catch a morbid fever that may last as long as 100,000 years” *The Independent on Sunday*, January 16, 2006; and *The Revenge of Gaia* (London & New York: Allen Lane/Penguin, 2006).

394 ppm, and there's already enough CO₂ out there to raise the official concentration to the vicinity of 430 ppm. And that implies that a fairly sudden and very fatal jump could happen at any time. Now we know that a concentration exceeding about 350 ppm will lead to disaster, in part because the last time CO₂ reached that level, 125,000 years ago, the sea level was 4 to 6 meters higher than today (5 meters is 17 feet). That leaves Florida, Bangladesh, the European lowlands, and countless coastal cities—*under water*.²⁶ Earlier scientific complacency about sea-level rise was shattered by the stunning rate of ice sheet melting, especially in Greenland and Antarctica.

The IPCC had predicted that once that concentration surpasses 400, a rise would result in global temperature of about 2 to 3 degrees celsius (that's 3.6 to 5.4 degrees fahrenheit). But that was based on older data, and, more importantly, doesn't factor in the precipitous, difficult-to-calculate jumps that come when "tipping points" are passed. Lovelock predicts a jump of 9 degrees celsius (16° fahrenheit), within the next few years or decades, probably following a temporary period of cooling.

Lovelock is convinced that humanity isn't up for facing reality and changing its suicidal behavior. It's still possible to avert the worst, though too late to avert the very bad. What we have to do, he says, is adapt to the horror we've made.

If Lovelock's climate science is right, his negativity about human capacity to take hold of the emergency and create a viable future is merely understandable given the experiences of his life and work, and given the response of the United States of America.

I prefer to believe in human possibility—in the highest sense. But between our current deadly predicament and that higher possibility must lie a spiritual revolution. We have the facts; we have the technology necessary to halt this slide into hell. But we continue the slide, deliberately ignoring the truth that cries out from scientific studies, measurements, and models. Leaders won't lead; not if offered the alternative of self-aggrandizement and popularity. Too many leading voices of the right wing seem to enjoy playing bully to science.

It's time for another leap in consciousness: not just for the sake of

26 Hansen, p. 142.

survival now; but for the sake of unimagined future possibility.

THERE IS SOME GOOD NEWS. California has worked seriously at improving the energy efficiency of its power plants and buildings, and insisted on more fuel-efficient vehicles. And noting that ten percent of home electrical use involves television sets, and the (surely foolish) federal action pushing people to buy more energy-hungry sets, the state has set the first energy standards for television sets.

The greatest achievements to reduce global warming are happening now in Europe. A popular movement may well have forced an end to coal burning in the United Kingdom by 2025. Britain has agreed to cut carbon emissions by 60 percent over 50 years, Holland by 80 percent in 40 years, and Germany by 50 percent in 50 years. Russia has ratified Kyoto. And even China—whose intention to burn huge quantities of dirty coal has everyone scared—*China* has established fuel economy standards for its cars and trucks that are much tougher than ours in the U.S. Faced with a combination of the scientific facts, and of notoriously serious air pollution, and with a government free from political restraints, China is investing heavily in alternative energy. On December 25, 2009 its National People's Congress passed a law requiring China's energy companies to buy a fixed percentage of energy generated through renewable sources—wind, solar power, hydropower, biomass, geothermal and ocean energy; the government will set the percentage every year and the power companies will have to do it. If that's more expensive, they'll have to buy it anyway or pay twice its cost in fines. Inadequacy of the power grid won't work as an excuse—they'll just have to upgrade the grid. China, meanwhile, outstripped the U.S. as the biggest emitter of CO₂—nevertheless leaving the United States as the biggest *cumulative* emitter of CO₂ since 1751, and by a wide margin (27.2% to 9.1%).

The Kyoto Protocol (relatively ineffectual as it is) is now in force, at least until 2012—signed by 142 nations—most recently Australia, in 2007, whose new Labour Prime Minister Kevin Rudd immediately signed on. But it was still resisted by the Bush Administration in the

United States, leaving it the only major industrialized nation to refuse. Meanwhile, the Bush Administration had been blocking a coalition of eighteen states led by California to impose more stringent economy and emissions standards. The Bush EPA Administrator overruled his own staff scientists and lawyers.

Germany has shown real commitment to making the transition to 100 percent renewable energy sources. The German government accepts the proposition that it is possible and they believe that everything depends on what we do between right now and 2020. Their accomplishments so far have been simply astonishing. In wind, in solar electricity, in solar water heating. Germany is the single fastest-growing market for photovoltaic power. The German government's planning and commitment runs through 2050. All this happened within ten years. But Germany's record is marred by a sharp reduction in 2009 in subsidies for alternative energy conversion resulting from the global recession, and, incomprehensibly, by plans to build new coal-fired plants to replace nuclear ones which are being shut down.

Britain, with 3,400 wind turbines in over 300 wind farms in operation so far, is spending \$117 billion to build more offshore wind farms—and the government believes they could generate three times Britain's electricity needs that way.

Already wind farms provide more than a fifth of Denmark's total power. While the affluent folks of Cape Cod were blocking the first serious windfarm in America because they don't want to look at it, the Danes think they're beautiful.

Will this be enough? James Lovelock thinks it won't be; that we must turn to nuclear energy—a view he shares with Hansen, who proposes a renewal of development of fourth-generation “fast” fourth-generation reactors that use 99 percent of the uranium as well as the very dangerous transuranic actinides that remain dangerous for 10,000 years. They leave far less waste, waste that can't be turned into weapons of mass destruction. By 1994 the Argonne National Laboratory had completed all the essential tests, and “fast” reactors might have become a reality, but in the wake of anti-nuclear sentiment following Three Mile Island and Chernobyl, the Clinton Administration killed the program entirely.

Better, safer nuclear reactors may be the only way to halt the mining and burning of coal. But that new generation of reactors doesn't yet exist.

THE OBVIOUS ALTERNATIVE, MISSED

But, to many of us, it appears that America and the world have repeatedly missed the chance to develop what would seem to be the obvious alternative. The molten salt reactor (MSR); specifically, the type of MSR known as the liquid fluoride thorium reactor (LFTR).

Oak Ridge National Laboratories first developed the concept in the 1970s. So a half century ago, and at several subsequent points, this safe, inexpensive, and unlimited alternative energy source was passed over. One of the reasons was the military's interest in the uranium-235 and plutonium reactor: you can make bombs with it. Another is the sheer momentum of what you're already doing. Westinghouse and General Electric developed the reactors that were built instead, and those are the reactors we're all familiar with—pressurized water reactors (PWRs) with solid nuclear fuel cooled with water under great pressure and controlled by control rods.

We know the problems. Quantities of nuclear waste. The possibility of meltdown and release of radioactive clouds. We witnessed Three Mile Island, Chernobyl, and Fukushima.

Somehow the fact that our daily use of fossil fuels creates massively more death and devastation than even the worst mishaps involving these outmoded reactors ever did—seems to escape us. The nuclear panic persists, especially among environmentalists, ironically enough.

So whatever is a molten salt reactor? What is a liquid fluoride thorium reactor, anyway?

Well, to jump backward a bit in time. Maybe five billion years ago some star in the vicinity of our Sun burned up its hydrogen and collapsed, as stars are wont to do, creating elements that included uranium and thorium—clouds of elements that coalesced into planets.

There's energy in those heavy metals. At the core of our Earth, it's thorium whose heat keeps the iron core molten and creates the magnetic

field which, in turn, divert the solar wind which would otherwise strip the plant of its atmosphere and water.

Nice benefits of thorium, to be sure, but here's what counts for our discussion of energy. Thorium is cheap and abundant all across the planet. And as fuel in an LFTR, it's dissolved into molten salt, becoming a liquid fuel that can circulate continuously through the reactor until it's burned completely. No waste.

Fluoride salts are the most chemically stable elements on Earth. They prevent dangerous radioactive materials from being released, even in the event of a serious accident. They stay liquid at the high temperatures necessary for the reactor's operation without having to operate at high pressure. They don't require an external energy source to cool them.

A thorium reactor is safe. It operates at high temperature but the fuel cannot melt down—it's already molten. And if the radioactive salt *leaks*, it solidifies in place. The reactors are compact and efficient, inexpensive to build and to operate.

Thorium is the nuclear fuel we should have been using. It's abundant, tremendously energy-dense, and safe. Thorium as a liquid fuel would be one thousandth as hazardous as uranium. And there's no out-of-control chain reaction because fission happens only as long as the thorium is bombarded with neutrons. Switch it off and it stops.

There are other variations of MSR, by the way. Some could burn the spent fuel from conventional water-cooled nuclear reactors, creatively getting rid of that dreaded nuclear waste we don't know what to do with.

So. Liquid fluoride thorium reactors offer the solution to global warming, and the world's energy poverty, and resource depletion and ensuing conflict.

A growing chorus is advocating thorium as the fuel of choice, and the development of LFTRs. The technology would be cheap, inexhaustible, secure, virtually waste-free, and safe.

LFTR can end developing nations' reliance on coal. Thorium can fuel small, modular reactors that could be mass produced and be affordable for poorer and developing nations. They could even produce

hydrogen that could replace petroleum fuels for our vehicles.

And—no small consideration—this boundless energy source can address the dramatic uptake in energy demand in developing nations, and that, it seems to me, is a necessary component for uplifting the world's poorest.

Another vital consideration. A reactor is a continuous, non-intermittent energy source. Solar and wind are both very intermittent. And when the wind stops and there's no sun (this regularly happens at night, if you hadn't noticed), the gas- and coal- and oil-fueled generators crank up. And this cranking-up process is a big piece of the problem because it produces enormous quantities of emissions, rivalling the cost of just running them all the time. When you factor in this consequence of backup from conventional sources, solar and wind may not ultimately do much to reduce CO₂ emissions.

I'd rather leave a fuller, better explication of all this to a physicist and expert, Robert Hargraves, whose book *Thorium—Energy Cheaper Than Coal*, you should read.²⁷

There is a problem, of course. I have spoken as if LFTRs actually exist. They don't. Hargraves thinks that a prototype LFTR could be operational in five years, and that another five years could see mass production. But U.S. R&D funding is nonexistent except for small projects at MIT, UC Berkeley, and the University of Wisconsin. France, the Czech Republic, Japan, Russia, the Netherlands—and now China—are investing in MSR research.

The great irony is that it was the United States that was developing thorium technology—a program that was quite advanced when Chernobyl-and-Three-Mile-Island panic scared the bejeezus out of the public. Doubling the irony, it was the Clinton-Gore Administration that halted the development of thorium-fueled reactors. It was finally President Obama's Energy Secretary Stephen Chu who, despairing of acceptance of anything nuclear in the U.S., and apparently understanding the urgency of developing thorium reactors, turned over the technology to China.

²⁷ Hanover, NH: Robert Hargraves, 2012. More at www.thoriumenergycheaperthan-coal.com.

In 2011, a 9.0-scale earthquake and resultant tsunami catastrophically destroyed the first-generation 1960s-era Fukushima Daiichi six-reactor plant on the northeast coast of Japan. The weeks of uncontrolled radioactive emissions shattered the recovery of faith in nuclear power. The fear was intensified by a new compendium of studies published by the *Annals of the New York Academy of Sciences*, that had concluded that the 1986 meltdown at Chernobyl in then-Soviet Ukraine had killed nearly a million people (though the official death toll is fifty-four). Its publication moved China to cancel thirty-five new reactors, with the likely consequence that China will replace them with coal-burning plants—coal, the one fuel unquestionably, and infinitely, more destructive than nuclear. We must hope their LFTR development proceeds apace.

Before Chu provided China with America's thorium technology, China approved the pebble-bed reactor, less prone to overheating and meltdown, cooled not by water but by nonexplosive helium gas. Pebble-bed and thorium-based reactor systems are among six classes of Generation IV reactors.²⁸

The Fukushima plant was a copy of the General Electric Mark 1 boiling water design, one so flawed that a safety official with the Atomic Energy Commission recommended in 1972 that the Mark 1 system be discontinued, one so flawed that three members of the design team resigned in 1976 in disgust, particularly because of what they knew would happen if the plant lost the capacity to cool both the active and spent fuel rods. And this one was built in a geologically unsafe fault zone on a tsunami-prone coast. Thirty-two of them are currently operating, twenty-three in the United States. One is located down Barnegat Bay from the town where I grew up; another one, Vermont Yankee, lies about 45 miles north of my former home in western Massachusetts,

28 Ambrose Evans-Pritchard, "The reactor that saves itself: safe nuclear does exist and China leads the way with thorium," London: *The Telegraph*, 23 March 2011. Keith Bradsher, "A radical kind of reactor," *New York Times*, 24 March 2011; Tuan C. Nguyen, "China to develop a greener nuclear reactor," *Smart Planet*, 4 Feb. 2011 (<http://www.smartplanet.com/technology/blog/thinking-tech/china-to-develop-a-greener-nuclear-reactor/6205/>). Bryony Worthington, Peer, "Why thorium nuclear power shouldn't be written off," *The Guardian*, 4 July 2011.

just over the state line. Vermont's Senate voted in 2010 to overrule the Nuclear Regulatory Commission and refused to relicense it to operate another twenty years. The NRC overruled Vermont.

Halting the planet's quickening warming will require nuclear power. It needn't come from outmoded and discredited technology.

It will take every effort to counter the continuing slide into disaster.

In December 2007 came the Bali Conference (there was another one at Bali in 2009), where the goal was to arrive at an international agreement on binding greenhouse gas emissions targets. As the nations of the world gathered, it was becoming clear that the situation is worse than previously thought; the IPCC's figures weren't up to date and its conclusions too conservative. Scientists were stunned by the progress of Arctic melting.

And what was at stake at Bali? United Nations Secretary General Ban Ki-moon opened the conference with this:

The situation is so desperately serious that any delay could push us past the tipping point, beyond which the ecological, financial and human costs would increase dramatically. . . . Succeeding generations depend on us. We cannot rob our children of their future. . . . The science is clear, climate change is happening, the impact is real, the time to act is now

adding that the price of inaction would include floods, famine, rising sea levels and loss of biodiversity, and that the choice is between a comprehensive agreement and "oblivion."²⁹

Philip Clapp, head of the National Environment Trust, said:

The scientists are telling us that this is the world's last shot at avoiding the worst consequences of global warming.³⁰

And speaking of the biggest polluters, the United States and China, Al Gore said

²⁹ Thomas Fuller, "Global Climate Talks Divided on Emissions Targets." *New York Times*, Dec. 12, 2007; and "Crunch Time for Climate Change." BBC News, Dec. 12, 2007.

³⁰ Geoffrey Lean, Environment Editor, "Rich countries blamed as greenhouse gas emissions hit record. Bali conference is the world's last chance to avoid 'catastrophic' global warming, experts warn." *The Independent on Sunday*. Dec. 2, 2007.

They will need to make the boldest moves, or stand accountable before history for their failure to act.³¹

The Bush Administration blocked the agreement on binding emissions cuts of 25 to 40 percent. Never mind that scientists have been warning that something more like a 90 percent cut will be necessary, and soon. It blocked technical and financial assistance to poorer nations to cut their emissions and to protect against rising seas and other devastating effects of climate change. It capitulated only in acknowledging the need for a new agreement to replace Kyoto. At various points the United States was booed and chastised by other nations.

“If you cannot lead, leave it to the rest of us. Get out of the way,” said Kevin Conrad, Papua New Guinea’s ambassador for climate change.³²

AND WHAT WOULD IT MEAN to *lead*? For political leadership, it would mean putting ample resources and the best minds to the twin tasks of *mitigating* the causes of global warming and *adapting* to the now-inexorable consequences of the warming that has already been set in motion. It would mean investing an agency of government with sweeping powers to implement the measures the science requires. It would do what is necessary to halt, as rapidly as possible, the burning of fossil fuels, putting human brilliance and labor to the transformation of transportation, infrastructure, and the lived environment of towns and cities. It would effectively curb the appetites of the wealthiest corporate powers on behalf of the good of the whole. It would clean up the scummy political process that now turns a very deliberately deaf ear to science, reason, and morality.

Instead, by a vote of 240-184, the United States House of Representatives, dominated by the Tea-Republican Party, rejected a resolution that said, simply, “Congress accepts the scientific findings . . . that climate change is occurring, is caused largely by human activities, and

31 Sarah Lyall, “Gore Urges Bold Moves in Nobel Speech.” *New York Times*, Dec. 11, 2007.

32 Juliet Eilperin, “Nations Forge Pact on Global Warming, Climate Change.” *Washington Post*, Dec. 15, 2007.

poses significant risks for public health and welfare.”³³ The statement was an amendment proposed by Rep. Henry Waxman to a Republican bill to strip from the EPA the power to regulate greenhouse gases, which passed. The House went on to slash NOAA’s budget for satellite hurricane tracking and weather forecasting. The prevailing votes were cast, mostly, by Republicans, but the disgraceful festival of idiocy was joined by a few Democrats, too.

Nearly everywhere, mitigation and adaptation projects already voted are being delayed, compromised, and curtailed to “save money.” That means delay, and delay is expensive. “We add \$1 trillion to the cost [of tackling climate change] with every year of delay,” said Christiana Figueres, executive secretary of the UN Framework Convention on Climate Change speaking at before the start of more international climate negotiations at Bonn as summer 2011 cranked up. She’d already upset several governments with her insistence that the negotiations need to be about holding the global temperature rise not to 2° C, but to 1.5° C.³⁴

In late summer 2011, Republicans who controlled the U.S. House of Representatives undertook a barely-noted attack on environmental laws by including thirty-nine riders to 2012 spending bills for the Interior Department and the EPA.³⁵ Among their riders: a one-year restriction during which “the Administrator of the Environmental Protection Agency shall not propose or promulgate any regulation regarding the emissions of greenhouse gases . . . to address climate change.” A ban on funding for the EPA to regulate motor vehicle emissions. Weakening protections against mountain mining. Allowing uranium mining in the Grand Canyon, halting a moratorium that is meant to protect Colorado River aquifer water on which 27,000,000 depend. Blocking the EPA from strengthening protections for wetlands under the Clean Water Act, exposing the wetlands to commercial development. Blocking the

33 Ben Geman, “Amendment that says climate change is occurring fails in House.” *The Hill*, E² Wire energy and environment blog, 6 April 2011.

34 Fiona Harvey, environment correspondent, “Global warming crisis may mean world has to suck greenhouse gases from air.” *The Guardian*, 5 June 2011.

35 “Concealed Weapons Against the Environment.” *New York Times* editorial page, 31 July 2011.

EPA from labeling the toxic ash from coal-fired power plants as hazardous waste. Blocking the EPA from limiting runoff of pollutants such as phosphorus and nitrogen into Florida's lakes and river. Defunding any effort by the Interior Secretary to limit oil, gas, and commercial development on public lands that are potential wilderness protection areas. There was more. There will be more. And when they happen, few will notice.

ON THE NIGHT OF APRIL 20, 2010, an offshore oil rig called Deepwater Horizon—so named because it was drilling for oil under 5,000 feet, or nearly a mile, of seawater in the Gulf of Mexico—exploded. The rig had drilled a further 13,000 feet—altogether, three miles—pushing the limits of both technology and safety. Water at 5,000 feet is under tremendous pressure. Oil and gas from even deeper surges upward under more extreme pressure, *between four and six tons per square inch*.

A month before the explosion, there'd been a series of accidents. One resulted in the damage (undisclosed by its operator, British Petroleum) to the blowout preventer, or BOP, a 400-ton device near the seabed. It's used to seal the well shut once it's been drilled so as to test the well's pressure and integrity. In the event of a blowout, it's supposed to seal off the well. The BOP had other malfunctions, and there have been subsequent claims that even with flawless maintenance, the design is flawed, and they simply don't work.³⁶) In defiance of law, it hadn't been tested since 2000. Now the well couldn't actually be tested, and there was no working blowout prevention device.

36 Mark Clayton, "Gulf oil spill: failure of blowout traced to bent drill pipe," *Christian Science Monitor*, 23 March 2011. Harry R. Weber and Michael Kunzelman, "Gulf probe: blowout preventer was flawed," *Associated Press*, 23 March 2011. *Final Report for United States Department of the Interior, Bureau of Ocean Energy Management Regulation, and Enforcement: Forensic Examination of Deepwater Horizon Blowout Preventer*, prepared by Det Norske Veritas, at <http://www.scribd.com/doc/51393879/DNV-Report-EP030842-for-BOEMRE-Volume-I>; with appendices at <http://www.scribd.com/doc/51393957/DNV-BOP-report-Vol-2-2>. Jim Landers, "Offshore well blowout preventer was supposed to be fail-safe," *Dallas Morning News*, 4 May 2010. Tom Fowler and Jennifer A. Dlouhy, "Blowout prevent report could prompt design changes," *Houston Chronicle*, March 24 2011. David Hammer, "Blowout preventer failure in Gulf of Mexico oil spill traced to bent drill pipe," *New Orleans Times Picayune*, 24 March 2011.

Then it came time to seal the well. Deepwater Horizon would motor off and another rig would be moved into place to pump the oil. And BP, which leased the Horizon from Transocean, had decided the procedure was taking too long, and cut some corners. Two hours before the explosion a pressure test showed “a very large abnormality” and was ignored. A vast cloud of methane—natural gas—rippled up from the bottom and settled over the area around the rig. The methane made the rig’s diesel engines rev wildly. There was an almighty explosion and inferno that incinerated eleven men.

So that 2010 incident. For weeks the oil flowed into the Gulf. BP’s early public estimate was 1,000 barrels a day, but the number was revised upward: 5,000, 30,000, 80,000, more. Could anyone measure accurately at such great depth? As vast plumes of oil began to flow into the critical Gulf Stream, the public got a revelation about what President Obama would call the “cozy relationship” between the oil companies and the government agencies that were meant to regulate them.

The Bush-appointed head of the Minerals Management Service, Chris Oynes—an old friend of former Vice President Cheney—announced that he was going into “retirement.” BP, it turned out, had been given a waiver from having to conduct the required environmental assessments prior to undertaking the project. MMS is a division of the Interior Department. Sixteen months into the Obama Administration, Oynes was still there. The corruption-plagued Interior Department was now led by Ken Salazar, whose career to date had demonstrated a pronounced fondness for offshore drilling. There were employees at Salazar’s Interior Department who describe their experience there as “the third Bush term.” Salazar had put fifty-three million new Gulf offshore acres up for lease, more than had ever been opened to drilling in a single year.³⁷ President Obama had just announced his support for offshore oil drilling, insisting that America needs the oil. The Tea-Republican Party had already distinguished itself with the phrase “Drill, Baby, Drill,” and now the GOP blocked efforts to raise limits on oil

³⁷ See Tim Dickinson, “The Spill, the Scandal and the President” in *Rolling Stone*, June 8, 2010 for a damning chronicle of a President who seemed to half-believe the scientists, whose initiatives seemed like half-measures, and who seemed over his head and short on wisdom.

companies' liabilities for oil spills, while mustering not a single sponsor for climate legislation (like the severely anemic Kerry-Lieberman bill, then under debate).

It came out that an MMS scientist had complained to his bosses of catastrophic safety and environmental violations, but MMS had already granted at least five final approval permits for new Gulf drilling as recently as the time of the Deepwater explosion.

To mitigate the mess, both BP and the government had deployed two types of a "dispersant" brand called Corexit. After 1.84 million gallons of Corexit were sprayed on the surface and hundreds of thousands of gallons more injected directly over the hemorrhaging wellhead, warnings were sounded that the substances could prove more lethal to life in the gulf than the oil itself.

Some degree of effectiveness can be claimed for the strategy. Microorganisms and bacteria seem to have consumed more of the dispersed oil than in the worst-case scenarios. But scientists wonder what effects these products, banned in nineteen countries, will prove to have had with the passing of time.

Some Corexit ingredients remained suspended deep in the Gulf, and some of the sea floor is covered with a layer of petroleum-related chemicals. A year after the incident, in the Bay Jimmy area south of New Orleans, scientists found a layer of glistening oil, the consistency of peanut butter, six inches under matted marsh grass, where the elements cannot break it down. No effective method had yet been found for cleaning those marshes, on which so many life-forms depend.³⁸ There were masses of casualties among birds, oysters, and tuna larvae. Hundreds of corpses of dolphins and their newborn have washed up on gulf shores. The Center for Biological Diversity estimated casualties at 26,000 dolphins and whales, and 6,000 sea turtles, and 82,000 birds, and countless fish and invertebrates.³⁹ A count of recovered carcasses cannot tell the real story, since most will have sunk without being spot-

38 Raffi Khatchadourian. "Gulf Wars." *The New Yorker*, March 14, 2011; Dahr Jamail, "BP's Criminal negligence exposed," Al Jazeera, 20 April 2011 (at <http://english.aljazeera.net/indepth/features/2011/04/201142011420104533120290.html>).

39 Elizabeth Shogren, "In cleaning oiled marshfields, a sea of unknowns," *National Public Radio*, 20 April 2011 (<http://www.npr.org/2011/04/20/135571426/in-cleaning-oiled-marshlands-a-sea-of-unknowns>).

ted. Oiled wildlife are still washing up dead. And NOAA has done no tissue sampling. But Nature seems to have shown a remarkable capacity for renewing itself from an assault by what seems to have been 4.9 million barrels (or 205 million gallons) of crude, and the accompanying 200,000 metric tons of methane. So far. It still isn't known what the consequences will be that the gulf floor is covered with the oily remains of oil-eating bacteria, or that miles of marsh are now fouled with heavy oil, or the death of so much fan coral. Meanwhile, doctors were seeing frightening symptoms in Gulf patients.⁴⁰

As of this writing, the full extent of the damage can't be known. Meanwhile, many scientists warn that any declaration of recovery would be premature because too much research has been either delayed, or kept secret. And while some of the secrecy is defended as necessary to the integrity of federal legal action against BP, it's hampering the science. And the delays, some political, mean the loss of the best data.⁴¹

The new Bureau of Ocean Energy Management (BOEMRE), part of the Department of the Interior, resumed permitting of new deepwater drilling at the end of February 2011. The first was for a site 6,500 feet down, 70 miles southeast of Venice, Louisiana, to be drilled by Noble Energy. Said BOEMRE Director Michael R. Bromwich: "the operator successfully demonstrated that it can drill its deepwater well safely and that it is capable of containing a subsea blowout if it were to occur." Faced with the unconvincing effectiveness of those blowout preventers, Noble contracted with Helix Well Containment Group for a "capping stack" device. Royal Dutch Shell, ExxonMobil, and Chevron already had permits; BP was requesting permission to resume drilling.

At least, more than eighteen months after the incident, the reelected Obama administration temporarily banned BP from new federal contracts. The EPA said it was doing it because of BP's "lack of business integrity" and that it will last until BP can prove it can meet standards.

40 Dahr Jamail, "BP anniversary: toxicity, suffering and death," *Al Jazeera*, 16 April 2011 (at: <http://english.aljazeera.net/indepth/features/2011/04/20114161153981347.html>).

41 Christopher Joyce, "'Quagmire of bureaucracy' stifles gulf spill research," *National Public Radio*, 20 April 2011 (at: <http://www.npr.org/2011/04/20/135573152/quagmire-of-bureaucracy-stifles-gulf-spill-research>).

Massachusetts Representative (now Senator) Ed Markey, who had called for the contracting ban, said “The wreckage of BP’s recklessness is still sitting at the bottom of the ocean, and this kind of time out is an appropriate element of the suite of criminal, civil and economic punishments that BP should pay for their disaster.” But it didn’t affect existing contracts or oil and gas production.⁴²

Oh, and in the *Times*, did I mention? Here it is, in the May 16, 2010 Auto section: a rave review of the Twin-Turbo Ford Flex SUV, “blissfully turbocharged, 355-horsepower EcoBoost V-6.” Reviewer Lawrence Ulrich gushes that the “federal mileage rating of the Flex with EcoBoost, 16 miles per gallon in town and 22 on the highway,” allows Ford to boast that “the power lunch is free, at least at the pump.” *EcoBoost? The lunch is free?*

A year and a month after the disaster, President Obama announced steps to *accelerate* oil and gas drilling on public lands and in public waters.⁴³

It could happen that in the near future, the struggle for required energy resources—whether the remaining petroleum or lithium for batteries or whatever—could give rise to literal war.

Michael Klare calls the contest for dominance among tomorrow’s possible energy sources a war. It engages what are apparently the most powerful entities on earth, the very corporations that already dictate policy to our governments.⁴⁴ Doesn’t promise to be pretty. In the summer of 2011, the five biggest oil companies reported combined profits of \$35 billion—in second-*quarter* profits. ExxonMobil boosted its lobbying budget by 25 percent and paid taxes at a rate far lower than the average American citizen while oil companies get billions of dollars in tax breaks while funding Republican political campaigns.

The Deepwater Horizon disaster, one would have thought, should have provided a fulcrum moment when rare Democratic majorities in

42 John M. Broder, “United States suspends BP from new contracts.” *New York Times*, 28 November 2012.

43 John M. Broder, “Obama Shifts to Speed Oil and Gas Drilling in U.S.” *New York Times*, 14 May 2011.

44 Michael T. Klare, “The New 30-Years’ War: Who Will Be the Winners and Losers in the Great Global Energy Struggle to Come?” *TomDispatch.com*, a blog of the Nation Institute, 26 June, 2011.

both houses of the U.S. Congress could have effected fundamental change, but the moment was pretty much wasted.

THEN CAME THE MONSTER STORM Hurricane Sandy in late October 2012. It was the largest Atlantic hurricane on record, 1,100 miles in diameter. After taking its toll in Jamaica, Haiti, Cuba, and the Bahamas, it devastated the Jersey Shore and portions of Long Island, Staten Island, and Queens. Over the U.S. Sandy sucked in a winter storm that dumped feet of snow on West Virginia. The damage extended to the Great Lakes. I've sometimes found myself haranguing that, on our present course, we could expect the flooding of the New York subways; in this storm, they were severely flooded, particularly in lower Manhattan, and the city learned that its subways, rail, and traffic tunnels have no protection against rising waters. (London and European cities guard their subway and rail tunnels with a series of gates that can be closed against floodwater.) My beloved Jersey Shore was reshaped; the barrier island resorts were rendered inaccessible. For awhile it seemed America had awakened to the fate we have prepared for ourselves. The cost: at least 253 lives and \$65 billion. Millions were left without electricity or telephones; many thousands were left homeless. The following month there appeared a scientific report that satellite measurements show sea levels rising sixty percent faster than the IPCC's computer projections. Another study had shown that sea rise due to global warming has already doubled the risk of extreme flood events, noting that half the U.S. population lives less than one meter above the high tide mark.⁴⁵

FROM LONG CENTURIES AND millennia of unchallenged myths and religious certainties about the Universe, we are left with a legal system that's incapable of protecting the very planet that sustains life, recognizes no inherent dignity or rights for the rivers, the forests, the animals, the air; recognizes in them no sacred quality.

But it cannot be enough merely to turn to ancient myth for our answers. Human consciousness must continue its advance, with the

⁴⁵ "Satellite measurements show flooding from storms like Sandy will put low-lying population centres at risk sooner than projected." *Guardian*, 27 November 2012.

help of its science and its rational capacities, knowing that this advance is not inexorable; that our own greed and folly has brought us to the brink of an inconceivable chasm. We have learned astonishing things, and amassed a store of knowledge never before available. Reversion to the beliefs and perspective of an earlier time is not the answer. We need a larger, stronger religious vision of one family of Life. There can be only one planetary citizenship: *that* is the only flag we can now afford to salute. But way beyond that, we need a spirituality that looks with awe to the Kosmos around us and within us and that begins to feel its place in the Kosmos.

You would think from the behavior of the human race today that we still held the beliefs and cosmology of primitive religions, from a pre-scientific age. It's brought us to the edge of a precipice. Here's how that primitive cosmology goes—so different from the universe we have discovered actually to stretch about us:

Above, the shining gods, and below, their obedient subjects, and under *their* feet, the earth, just a bunch of dead rocks and dirt with no life in it, no divinity about it.

And the human part of that hierarchy, the part between the gods above and the dead earth beneath—some of them were the god's special chums, the specially chosen elect. All the others were just heathen.

Under that vision, the earth's human inhabitants have sectioned off the planet into just short of two hundred nation states, and—to quote the eloquent Thomas Berry —

these nations exist in an abiding sequence of conflicts that have grown especially virulent in more recent years as our scientific and technological skills have given us increasing control over the enormous powers contained in the physical structures of the earth.⁴⁶

BEYOND THE NATIONALIST FERVOR and the greedy despoiling of the earth, we need a larger, stronger religious vision of one family of Life. There can be only one planetary citizenship: *that* is the minimal jurisdiction

⁴⁶ Thomas Berry. *The Dream of the Earth*. San Francisco: Sierra Club Books, 1988, p. 218.

of the only flag we can now afford to salute.

BUT EVEN THIS LARGER HUMAN IDENTITY is not yet large enough. I was struck that Thomas Berry, who was once a priest and now calls himself a geologist, would say this:

My own view is that any effective response to these issues requires a religious context but that the existing religious traditions are too distant from our new sense of the universe to be adequate to the task that is before us. . . . The traditional religions . . . cannot presently do what needs to be done. We need a new type of religious orientation. This must . . . emerge from our new story of the universe.⁴⁷

And Thomas Berry says this new religious orientation is really a new revelatory experience, one that we can understand as soon as we recognize that the evolutionary process is, from the beginning, not just a physical process but a spiritual one.

WE MUST HAVE A NEW SPIRITUAL VISION that is not accountable to the ancient mythic universe and its gods and scriptures, its bishops and ayatollahs and, I say, its corporate powers. We must hear the new story of the universe and take it to heart. It is true—and extremely fortunate—that many religious people in many faith-traditions have found in their traditions a basis on which to champion the cause of the Earth. But in a time still largely governed by outworn myth—it's time for a life-giving alternative.

THOSE WHO STUDY THE VERY STRUCTURE of the universe are coming at last to understand a universal story, and even though there are still many variations,—for the first time in its history the human community has a single story of its origin. Physicist Brian Swimme⁴⁸ sums it up well:

47 Berry, *The Dream of the Earth*, p. 87.

48 Brian Swimme. *The Universe is a Green Dragon: A Cosmic Creation Story*. Santa Fe: Bear & Co., 1985, p. 27. Also recommended: his 2011 *Journey of the Universe* with Mary Evelyn Tucker (Yale University Press).

This was a fire that filled the universe—that *was* the universe. Every point of the cosmos was a point of this explosion of light. And all the particles of the universe churned in extremes of heat and pressure, all that we see about us, all that now exists was there at the beginning, in that great burning explosion of light. . . . We can see the light from the primeval fireball. Or at least the light from its edge, for it burned for nearly a million years. We can see the dawn of the universe because the light from its edge reaches us only now, after traveling twenty billion years to get here.

That great light is now spread through this universe. You can hear it on the radiotelescopes; and you can't look up into the night sky without looking back into our origin. I don't know what that sight evokes in you. It makes me tremble.

There is not a thing in this wide universe that does not share a common origin. What does this mean? Swimme:

The material of your body and the material of my body are intrinsically related because they emerged from and are caught up in a single energetic event. Our ancestry stretches back through the life forms and into the stars, back to the beginnings of the primeval fireball. This universe is a single multiform energetic unfolding of matter, mind, intelligence, and life. And all of this is new. None of the great figures of human history were aware of this. Not Plato, or Aristotle, or the Hebrew Prophets, or Confucius, or Thomas Aquinas, or Leibniz, or Newton . . . We are the first generation to live with an empirical view of the origin of the universe. We are the first humans to look into the night sky and see the birth of stars, the birth of galaxies, the birth of the cosmos as a whole. Our future as a species will be forged within this new story of the world.⁴⁹

Albert Einstein was repelled by the implication of his own theories—that the cosmos originated in a singularity in the distant past—out of nothing. He tried to find a way to make it not be true, a way to be able to see the Universe as having some sort of cosmological constant so that it would not have to have come into being like that, in an instant, from an inconceivably small, inconceivably dense beginning, in inconceivable heat, exploding into being. The British astronomer Fred Hoyle tried to mock the whole idea by calling it the “Big Bang.” Seems Einstein’s

49 Swimme, *The Universe is a Green Dragon*, p. 28f.

later idea was wrong, and that he'd been right in the first place.

But why is there anything at all, instead of nothing? Consider: apparently, at the heart of all Being, there is a roaring engine of creativity. In his 1927-28 Gifford lectures at Edinburgh published as *Process and Reality: An Essay in Cosmology*, Alfred North Whitehead spoke of “primordial” Being—unmanifest, pure potentiality without any of it realized—and “consequent” Being (or rather, *Becoming*), manifest within the stream of time, evolutionary in its nature. Which is another way of saying: *out of the nothingness and void, Something. The Big Bang.*

It's baffled scientists tremendously that it would all have come off so perfectly as to create a Universe that could evolve and support life.

How is it that every aspect of the evolution of the Universe is dependent on the very precise values of what seem like arbitrary constants of nature—like, for instance, the strength of gravity, not too strong, not too weak?

You'd think I was about to make a case for “Intelligent Design,” wouldn't you? I'm not. There's a very basic flaw in “Intelligent Design.” It's a decoy to try to force the conclusion that if there is intelligence in the design of the Universe, there had to be a Designer, a God who was clever enough to design it.

Theoretical physics is now in search of a far more sublime way to see this Universe of Life. It hints at a life and intelligence about everything, and about the universe as an intelligent organism. What is this Universe, anyway? What is the nature of—well, of Nature?

The dominant hypothesis (though it still defies experimental proof) is something known as M-Theory or Superstring Theory. At the heart of it all, it says, beyond the subatomic particles, quarks and so on, electrons, photons—are tiny submicroscopic one-dimensional strings of energy—modes of energy vibrating with delicate precision in a very specific way in some eleven-dimensional hyperspace.

Cosmologist James Gardner⁵⁰ —along with Stephen Hawking and along with the Astronomer Royal of Britain Martin Rees, and along with others—thinks there's some sort of fundamental intelligence about the Universe itself. It is self-organizing. It is inherently creative and

50 James N. Gardner. *Biocosm: The New Scientific Theory of Evolution: Intelligent Life Is the Architect of the Universe*. Inner Ocean Publishing, 2003.

intelligent. Nobody, no god outside of it, had to design it.

Its inherent intelligence seems to have at its heart a purpose: an unfolding, ever-more complex, evolving Life, higher and higher Life, higher and higher intelligence.

Maybe we are part of some vast and still-undiscovered cosmic community. Maybe we share a common fate with that cosmic community.

What if we are part of an astonishing wave of creation that includes the future as well as the past? What if we're being drawn into a very creative future, but faced with choices about whether or not to participate, about how to participate.

Maybe the future fate and destiny of something far more than the Earth—maybe the future fate and destiny of the Kosmos itself—depends in part on us.

THE UNIVERSE BECOMES AWARE of itself through the humanity it has created. In everything you do, the Universe reveals itself and discovers itself. You are defining what is to come. For we are not merely descended from the first fire; —

We are that first fire after 14 billion years of creative work.

We are the universe aware of itself, reflecting on itself, communicating and reflecting on its own existence, its own possibilities, deciding its future.

SOMETHING IN US RESOUNDS, RESONATES from that first fire, and resonates from the very Heart and Ground of all Being from which that fire ignited, and resounds from the stars that churned out the elements we are made of, and from the implicate genius of this living, this intelligent universe. It is a part of us. You were there.

But that is not the song we hear much of the time, and if you listen carefully some Sunday morning you will not hear very many songs about the interdependent web of all existence. You will hear, “Onward Christian soldiers, marching as to war,” and you will hear frothing declamations about the saved and the damned. Outside, you will hear the hum of an economy so insensitive to the earth that the seas, the air

and the ground are still receiving fresh poisons.

WE MIGHT FIND OURSELVES YEARNING for an earlier time, to live as long-vanished ancestors lived. *They* didn't bring life on Earth to a precipice, after all. But if the ancients didn't bring us to the brink of ecological cataclysm, it wasn't because they possessed moral superiority or a greater grasp of the interdependent ecology of all things. In fact, there just weren't enough of them, and they hadn't developed the powerful technologies that we now have at our command, for good or for ill. You can't create nuclear winter with bows and arrows. Horses and buggies don't pollute a whole lot (though there is the methane), not unless you're thinking of horse poo in the streets. Let's not romanticize the past. With an awareness never before known, we stand at a threshold.

THERE'S SOMETHING VERY PERSISTENT about the old myths.

When Giordano Bruno, a priest and philosopher who had studied with Copernicus, challenged the prevailing doctrines about the universe, his ideas got him shackled in an ecclesiastical prison for his last seven years and then burned at the stake in Rome in 1600. If today you speak on behalf of the Earth and the interdependent web of all existence of which we are a part—you will have corporations, right-wing media, the Republican Party, and the and popular consumer culture against you.

This is from the *Guardian* of London, by Paul Brown:⁵¹

A far-reaching inquiry into the careers of three of the US's most senior climate specialists has been launched by Joe Barton, the chairman of the House of Representatives committee on energy and commerce. He has demanded details of all their sources of funding, methods and everything they have ever published.

Mr Barton, a Texan closely associated with the fossil-fuel lobby, has spent his 11 years as chairman opposing every piece of legislation designed to combat climate change.

The inquiry was directed at Michael Mann, director of the Earth System Science Center at Pennsylvania State University; Raymond Bradley,

51 "Republicans accused of witch-hunt against climate change," August 30, 2005.

director of the Climate System Research Center at the University of Massachusetts; and Malcolm Hughes, former director of the Laboratory of Tree-Ring Research at the University of Arizona. Barton launched his inquiry after the *Wall Street Journal* quoted an economist and a statistician—neither with any background in climate science—claiming methodological flaws and data errors in the scientists’ calculations and accusing them of hiding their original material. Nor was he content with the allegedly undisclosed data: he was demanding details of everything they had done since their careers began. *The Guardian* continued:

The inquiry has sent shockwaves through the US scientific establishment, already under pressure from the Bush administration, which links funding to policy objectives.

Joe Barton no longer chairs the House Energy and Commerce Committee (though when Republicans won back control of the House in 2010, he attempted a return—and when, after he apologized to BP when President Obama secured a twenty billion dollar escrow fund to pay claims for spill-related losses—calling the President’s demand a “shakedown”—the party allowed him to retain his membership on the committee). Instead, the chair went to Fred Upton, of Michigan, who proceeded to have his GOP-controlled chamber vote to block EPA regulation of greenhouse gases.

Democrats had barely taken control of Congress in 2006 when the Bush White House intensified its campaign—exposed by Dr. James Hansen, who insistently warns that we have very little time to halt the catastrophic processes now in motion—to thwart and throttle government research on climate change. Public leaders united with public media in communicating the message that there’s nothing much to worry about. We’ve gained a kind of security, or illusion of security, from the idea that we are separate from nature and can control it.

Now the dominant forces in our society are desperately betting everything on the idea that the universe is just dead matter. How could an Alaskan wildlife reserve have a spiritual life? If a mountain has no inner reason, no sacredness unto itself, then to get coal out of the soil you just cut away half the face of the mountain. But all of this is part and parcel of the world of life that has given rise to human consciousness

and now sustains it. Never mind that the mountain begins to erode and chemicals enter the streams and trees die, and plants, fish, and animals. And eventually, so do we.

It doesn't really matter how obvious the consequences of the madness are. The madness goes on because it is madness.

There is an intelligence, by which the grass knows how to grow, by which, when we can transcend our own narrow thoughts and identity, we know ourselves to be a part of Nature. There is a unitive force, a love toward all existence. We know that *we are* nature, that *we are* the first fire.

AND WE OURSELVES: WE HAPPEN to be living our lives just at a turning point for life on this threatened planet. We ourselves are becoming part of this change.

The equilibrium is disturbed.

The late physicist Ilya Prigogine wrote that

we are at a moment of profound change. . . . We know that societies are immensely complex systems involving a potentially enormous number of bifurcations [or turning points]. We know that such systems are highly sensitive to fluctuations. . . . As a result, individual activity is not doomed to insignificance.⁵²

We live not in a universe of eternal laws but of implicate intelligence and innovation, a roaring engine of creativity. We are participants. We are this world, this Universe. We are the vehicle by which this Universe becomes conscious.

When you allow the magnitude of all this to settle in, when you contemplate the depth of our existence, and its possibility and its destiny and its unity—then do not words like “worship” and “reverence” take on a whole new meaning?

And does not your life take on dimensions of expansiveness and possibility and beauty you hadn't imagined?

And don't your choices and commitments take on a power and a magnitude you hadn't imagined?

⁵² Ilya Prigogine and Isabelle Stengers. *Order Out of Chaos: Man's New Dialogue with Nature*. New York: Bantam, 1984, p. 312f.

How *then* shall we live these lives of ours? Shall we participate by subjugating higher intelligence and higher human possibilities to the lower interests of greed and domination? What will become of this immense upward journey of Life and intelligence?

The times require those who will commit in some profound way to take our place in this interdependent web, and to *love* this community of life, this first fire, of which we are a part. What we do on behalf of the Earth will not be the skin-deep effort on the part of those whose chief aim is to appear politically correct. Nor will it be a burden or a sacrifice—any more than the things we do for someone we love feel like a burden or sacrifice. *Love does not worry about doing too much, being too extravagant.* We must now speak and act out of devoted love and not less.

The times require moral leadership, and they require creativity, and above all things, they require the gentle force of love.

And the times require those who know their place in this web of life, know they are bound by an everlasting covenant to a larger life, know they are come from that first fire and share as citizens in a vast community of life. Who believe in the significance of their own words and deeds.

But our vision will be helplessly befogged as long as we insist on cheating on our fundamental covenant with life. For one thing, we will have to curb the thirst for oil that has bent our moral compass, a thirst that is always made more vivid for me when I return to the United Kingdom, with its tiny automobiles and abundant public transit and thousands of giant wind turbines. It may begin with something as simple, in our own household, as figuring out how to replace more of these incandescent bulbs with compact fluorescent ones and LEDs, because that is something that lies within our power to do. But those who care enough to do the simple things must now do the big things: change the laws and revolutionize the popular imagination.

In these times, doesn't sacred imagination take on a new urgency? See how old institutions, blinded by conventional vision, bankrupt of holy imagination, lacking the vision to see that there is far more future than past, far more unfolding for this Universe of Life to do to fulfil

its destiny and purpose—see how they fail us. How, then, shall we live? How structure our lives?

We must be a force and a factor, together in communities, and each of us where we are. The changed consciousness and the gentle awareness that all of Life is one—will have to replace the cynicism, and the campaign rhetoric, and the official lies and the unofficial denial, soon.

The generation coming of age now—and all of us living—have the potential to bring a new vision to society. Like this, proposed by Andrew Harvey:⁵³

Any spiritual vision that does not ask us to calmly face the appalling facts is, I believe, whether consciously or unconsciously, conspiring in our infantilization and so in our destruction. . . .

The only response that I find honorable in this potentially terminal situation is that of dedicated love.

And this is the important part, and this is where the prophecy comes in. Because if the glaciers continue to melt into the rising seas, and if the oil and coal goes on burning (and the oil and coal industries go on owning and operating the United States Congress), and the carbon and methane and pollutants go on streaming into the seas and rivers and air and ground, and the public carries on its self-delusion, it will be literally the case, as Harvey points out, that it's our own lungs we're burning, our own veins we're pumping with poison, our own bodies that will be engulfed.⁵⁴

WITH THE NEW MILLENNIUM, NEW powers arose and took the reins of government. The scientists began issuing their increasingly urgent warnings, and the small voices that rose in protest were not enough to halt the processes that had been set in motion and were sustained by greed.

But never has there been anything like the last few years, when the ink on one urgent scientific report is barely dry when another, more

53 Andrew Harvey. *The Return of the Mother*. Berkeley: Frog Ltd., 1995. 436f.

54 Andrew Harvey with Mark Matousek. *Dialogues with a Modern Mystic*. Wheaton, IL: Quest Books, 1994, 36.

ominous, more appalling, is issued. Among scientists and scientific organizations there is virtual consensus. The only holdout is the American Association of Petroleum Geologists, with its deep ties to the fossil fuel industry. By 2002 fourteen scientific papers on global warming had been published; now there are a thousand. A 2004 *Science* magazine survey of scientific studies on climate change showed that 928 peer-reviewed papers supported the reality of global warming and zero denied it. Yet the American media continue to pretend that the jury is out.

WE WOULD BE RIGHT TO TREMBLE at the thought of what will happen to this world of Life and Nature if we, the human component of the world, fail to do what must be done to save it.

Can we see with holy imagination this radiant world, ourselves participants in its unfolding, sharing, if we will, its magnificent destiny?

The alternative—the consequence of moral blindness and the failure of sacred imagination—the failure to see what we are, and of what we are a part, and the consequences of our choices—is a cosmic tragedy that is just too tragic to contemplate.

Toward the end of his book, *Biocosm*, James Gardner says this:

The notion that every creature, great and small, plays some indefinable role in an awesome process by which life gains hegemony over inanimate nature implies that every living thing is linked with every other bit of living matter in a joint endeavor—a kind of cosmic “Mission Impossible”—of vast scope and indefinable duration. We soldier on together—bacteria, people, extraterrestrials (if they exist), and hyper-intelligent computers—pressing forward, against all odds and the implacable foe that is entropy, toward a distant future we can only faintly imagine. But it is together—in a spirit of cooperation tempered by conflict—that we journey hopefully toward our distant destination. If, like Sisyphus, we are occasionally pained by the weight of the stone we are pushing uphill and if our task strikes us, at least sporadically, as futile and absurd, we can at least take comfort in the astonishing fact that every creature that ever lived and ever will live shares our existential plight.⁵⁵

If, reading this, you decide to become sad, depressed, discouraged—that is a choice. I recite these things so that you can become energized

by the knowledge that this Earth that gives us life, this Earth we love, now needs us.—

That our lives need not be lived without meaning or purpose —

That what we do now matters and that we are honored to share in a great work. What an honor to be a part of the generation of humanity to which this work is entrusted!

Who will do what must be done? Whose committed and daring efforts will turn the tide? This is who:

It will be those who love this Earth and love the evolutionary process of which both the Earth and we ourselves are a part, as much as they love their lives, love them more than their possessions, their ambitions, their security; who know the threatened planet as their beloved friend.

There is a stark difference between using this Earth, and loving it. It will be those who, like Annie Dillard, everywhere they look, see fire; and in whose eyes the whole world sparks and flames with glory. It will be those who, like Mary Oliver, in the morning feel themselves held in great hands of light.

Henry Thoreau's Transcendentalist friend Bronson Alcott wrote this in 1840:

Nature is not separate from me; she is mine alike with my body; and in moments of true life, I feel my identity with her; I breathe, pulsate, feel, think, will, through her members, and know of no duality of being. It is in such moods of soul that prophetic visions are beheld . . . for the joy and hope of mankind.

When you breathe the spectacular Spring air, tell me, is there anything beneath, beyond the surface?

If there is a human capacity to forget, to lose sight, to see only the daily grind and the quest for wealth and advancement —

— there is also a human capacity to feel something else, some universe beyond this surface, a sense of belonging to a bigger drama, a realm beyond the surfaces and appearances of things.

Shelley gave words to this sense:

The everlasting universe of things
Flows through the mind, and rolls its rapid waves . . .
I seem as in a trance sublime and strange

To muse on my own separate fantasy,
My own, my human mind . . . ,
Holding an unremitting interchange
With the clear universe of things around . . .
. . . all seems eternal now.

You and I are part of a larger drama and we can become forces of Nature.

LET US ENSURE THAT THE YOUNGEST among us learn from our deep commitment and passion for this magnificent Earth. We will have to find palpable ways to structure and focus our lives to that end. The work that beckons to us is a work of love.

And, says St. John of the Cross, when we “drink at the very sources of the science of love,” we finally see what ordinary consciousness cannot.

Look and see the world radiant with the glory from which it flows. See the radiant and majestic grace in a day, in every leaf and tree;—in the air you breathe feel its life, let it wash you through with music, and let it penetrate to a core of you that can never, never close to it again.

Can we see beyond the rubble and turmoil—this great surging Mystery of Life? this Nature and the Life of the Kosmos, the Intelligence that made of the cosmic dust, stars and planets and rivers and people, and that is not finished its work?

Its work is now our own. A humanity whose imagination has been fired by that understanding can, out of the heart of the crisis itself, answer this climate emergency with brilliant innovation and a new vision of human life on earth that makes real our highest future possibility, living and creating from that coming splendor.

Now: Imagine you are the Universe, since you *are*. It's taken you 14 billion years to achieve *consciousness*, which you've done through your human presence. When you awaken, it's the Universe itself that's waking. Look around you. Your capacities are great, your creative powers almost without limit. What are you going to do?