

## On Unstable Airs, Acidified Waters, and Endangered Places

How Global Warming is generating Climate Chaos and widespread denial.

By Joseph Siry

In the sense of Hippocrates,<sup>1</sup> the ancient Greek interpreter of nature's health and human settlements, contemporary industrial culture has significantly exceeded the recuperative powers of airs, waters and places that were once a realm of titanic forces considered to be beyond human influence. What had been the province of physical and chemical cycles on earth is now an example of pollution tipping the capacity of natural areas to absorb the residual by-products of manufacturing, commerce, and deforestation.

“Our comforting sense of the permanence of our natural world, our confidence that it will change gradually and imperceptibly, if at all, is, then, the result of a subtly warped perspective.”<sup>2</sup> As Bill McKibben commented nearly two decades ago that humans have developed the capacity to alter the atmosphere thereby affecting all natural weathering and the reproductive processes of many species on earth. More significantly, “Our reassuring sense of a timeless future, which is drawn from that apparently bottomless well of the past, is a delusion.”<sup>3</sup> He contends that past climate variations are no longer reliable as predictive patterns for our future because our human pollution remains so prolonged, so pervasive and so decisive.

He largely has it right in saying that “In the last three decades...the amount of carbon dioxide in the atmosphere has increased more than 10 percent, from about 315 to more than 350 parts per million.”<sup>4</sup> Except that currently the measure is nearly 390 ppm; up 40 ppm in 18 years from McKibben's 1990 warnings.

We have reached this unprecedented threshold because we are A. unable to see, B. misinformed C. wedded to habitual behavior patterns that generate waste, D. in denial, and E. ever so ill-educated on how small amounts have huge potential consequences based on mathematics and dynamic equilibrium.

Andrea Merkel, German Chancellor, called it too late to stop global warming because of the accelerating rate at which the industrialized nations are increasing their heat trapping gas emissions. French President Nicolas Sarkozy has argued the matter is so serious that the European Union needs a carbon tax as an effective means of addressing the numerous and scattered sources of air pollution that are precipitating climate chaos due to global warming.

Despite European leadership on recognizing the matter as a serious threat that we can act to ameliorate or to which we must readjust, recent evidence from the Pew Foundation reveals a disturbing trend. As more Americans believed that global warming is an urgent environmental problem than did so 8 years ago, slightly more people think it is natural than thought that four years ago. The Pew's findings implications are that more informed Americans insist that there is nothing people can do to change the cycle. By deduction, we are not responsible for the

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<sup>1</sup> \* Hippocratic tract: Airs, Waters, Places. 400 BC

<sup>2</sup> Bill McKibben, The End of Nature, p. 8.

<sup>3</sup> Ibid. p. 5.

<sup>4</sup> Ibid. The ppm stands for parts per million.

pollution from fossil fuels that drive the climate crisis over a threshold that many are calling a tipping point for carbon saturation of the atmosphere. Colorless, odorless and timeless, the accumulating carbon vapor gas does not enable observers to see the widespread links among air, water, and places. Experts insist we have but a decade remaining to reduce emissions.

Climate altering pollution is a rate problem I call climate chaos because we are intensifying normal variability. We are beyond an historic range—due to the rapid accumulation of heat trapping gasses—caused by a pollutant that has a long residence time, is readily absorbed by the oceans, and then for generations to come lingers to sculpt the character of places that have defined our lives. In just a lifetime, accumulating carbon dioxide pollution has created a more acidified ocean and melted both long-standing glaciers and permafrost beneath polar landscapes. In tropical seas, diverse coral species have succumbed to warmer and more acid waters to such an extent that these remaining coral reefs may cease to exist in this century.

When faced with an odorless, clear and apparently non-toxic pollutant it is hard to convince audiences to act. That this problem is due mostly to combustion and, in part, to land-use practices that rob natural areas of their capacity to retain carbon on site and accumulate carbon that otherwise traps heat radiation in the air and oceans, what must we say to motivate our students, communities and leaders to see ancient connections in contemporary problems?

While clearly a technical problem, the need for an uncommon level of awareness raises psychosocial problems for the public and a daunting spiritual plight. The twin spiritual dilemma arises because affected populations are not the provocateurs of global warming and many of the world's religions command people to properly steward the resources of this earth to share them more effectively with disadvantaged groups in the community. The breadth of the impacts on people, vegetation, and wildlife is daunting to examine. Yet the technical depth of this problem encourages most cautious scientists and informed commentators to say that this is the most protracted, persistent and perilous impediment humans have ever faced.

For example, if McKibben is correct by saying, “This new rupture with nature is different not only in scope but also in kind.... We have changed the atmosphere, and thus we are changing the weather.” Then his inescapable conclusion that “By changing the weather, we make every spot on earth man-made, and artificial. We have deprived nature of its independence, and that is fatal to its meaning. Nature's independence *is* its meaning, without it there is nothing but us,”<sup>5</sup> places policy makers in a difficult if not losing endgame because of our choices. The Hobson's choice of drill or die in the dark or the French atomic power scenario as a promising blueprint for a nuclear energy revival competes now; volatile oil prices obscuring the public's preferences for conservation and adaptive management.

The endgame with respect to humans and wildlife is more like a protracted game of bridge in that **Regionally biological diversity—or the species richness, habitat variety and genetic variability of plants and animals—will unexpectedly change due to climate chaos. To what extent and to what degree of damage remains difficult to know with great certainty for three related reasons.** First is the swiftest pace of rise in heat trapping gases in 10,000 years, next there is the profound suddenness since 1950 with which this shift has occurred, and finally

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<sup>5</sup> McKibben, op. cit., p. 58

the accumulated level of carbon dioxide in the air is unprecedented in the past 650,000 years. Currently, with respect to Arctic wildlife impacts and subsistence populations depending on wildlife, evidence indicates an abrupt physical shift triggering biological responses. Evident in wildlife and botanical studies from the Antarctic, the Central American isthmus, among mountain terrains in the Great Basin, and in southern Africa where observed patterns of abundance of flora or decline in fauna are indications of what may come.

Clear, predictive patterns do not emerge--aside from case specific responses of mammals, amphibians, butterflies or flowering plants--to foretell abrupt temperature and rainfall changes. However, IPCC scientists in 2007 have advised that given a three degree Celsius temperature rise over the next century, up to twenty percent of the species may face extinction and minimally twenty million people may become climate refugees.<sup>6</sup>

Such assertions are based on studies revealing that declining soil moisture, average temperature increase, changes in the frequency and abundance of precipitation, an advance in the onset of spring in the northern hemisphere, and ocean acidification are all persistent physical patterns impairing biodiversity. These impacts do not reveal --in their pronounced abruptness or accelerating rate-- any natural cycle. These globally evident patterns are not due to orbital variations of the earth around the sun, or periodic wobble of the planet about its axis of rotation. Instead, these climate shifts arise from pollution and loss of forest cover. The accumulation of carbon dioxide in the air has accelerated from an average of over 1 ppm annually in the 1960s to over 3 ppm in the last decade. Further, the biotic responses associated with observed changes in the range of butterflies, or abundance of amphibian species, or sufficient prey for puffins, penguins or polar bears indicates that abrupt temperature shifts in higher latitudes and upper elevations is well underway. People do not widely understand or appreciate the threats to animals and long-lived plants in adapting to multiple or abrupt pressures.<sup>7</sup>

There is now a rare scientific consensus<sup>8</sup> that the heat absorbed by the oceans will continue to affect the planet for some decades, if not centuries to come. Those influences are most likely to quickly accelerate, if present population and pollution trends continue, after 2050. These impacts, as manifest in ocean thermal expansion causing sea levels to rise, will also include a shift in the frequency and abundance of rainfall away from the tropics and toward the polar latitudes. Existing studies show that some mating strategies among mammals are adaptive under rapid changes in thermal patterns, but other strategies are not. Rapidly breeding creatures with multiple small eggs will have a genetic and a population advantage, over those breeding populations with fewer offspring and longer gestation periods. Generalizations fail to capture the enormity of the range and the subtle variation in adjustments now observed among species. Subtle variations are important for indigenous hunting and gathering populations and wildlife managers alike. Twelve years ago, IPCC specialists advised that "the composition and geographical distribution of many ecosystems will shift as individual species respond to changes in climate; there will likely be reductions in biological diversity" and "entire forest

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<sup>6</sup> Intergovernmental Panel on Climate Change, "Climate Change 2007: The Physical Science Basis, Summary for Policymakers, Contribution of Working Group I to the Fourth Assessment Report," pp. 8, 14-18.

<sup>7</sup> Camille Parmesan, "Ecological and Evolutionary Responses to Recent Climate Change," *The Annual Review of Ecology, Evolution, and Systematics*, on August 24, 2006, p. 637.

<sup>8</sup> Jeffrey D. Sachs, "Fiddling While the Planet Burns," *Scientific American*. 295:4 (October 2006), p. 39.

types may disappear.”<sup>9</sup> For example, sugar maple is replacing Quebec’s white fir forests as the species retreats north from its former range in New England.

Emerging evidence suggests that abrupt acclimatization is difficult. Kirtland’s warbler of the southern Great Lakes region faces extirpation due to climate change. Recent arguments in *Scientific American* suggest that pitting nature against people makes little sense as we approach the “tipping point” of carbon dioxide saturation of the oceans and atmosphere. Two researchers last year suggested that “Casual observers do not always see links between human well-being and aiding endangered species, but such connections abound in many situations that engage conservationists.” Difficult though these connections are to envision and act upon, Kareiva and Marvier point out that: “Ecosystems such as wetlands and mangrove stands protect people from lethal storms, forests and coral reefs provide food and income; damage to one ecosystem can harm another half a world away.”<sup>10</sup> More particularly in the Pacific Northwest research shows that the character and number of the salmon spawning contribute to the amount of nitrogen required by thriving forests and that ingredient is derived partially by the soil bacteria and fungi from the decaying –post spawn—fish or the animals dependent on these annual fish runs.

Our inharmonious relation to nature is deep-seated. Unconsciously we have changed the very air we are breathing now. Together we shiver in isolation from the very ecosystem services we must nurture because most people do not see the connections among health airs, waters and wilder places and our civil societies needs. Global climate chaos just exacerbates current practices of disrupting geo-chemical cycles which life when thriving incorporates into stable vegetation, wildlife and fishery services and ultimately into reliable agricultural products. Those who followed Hippocrates may have ultimately, incorrectly identified how nature pieces together to influence human health but as we so disturb the planet, we are beginning to understand the wisdom of how carbon ties together the vital characteristics of places with air and waters. If, as Europe has, we could change carbon from a pollutant to a commodity, we might begin to properly value ecology. As disturbing forces in natural history, can we do any less since confronting such daunting problems we are so ill equipped to modulate our intensity?

1943 words.

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<sup>9</sup> Watson, et. al. eds. *Climate Change 1995: Impacts, Adaptations and Mitigation of Climate Change: Scientific-Technical Analyses [IPCC Working Group II]*, Cambridge, U.K.: Cambridge University Press, 1996. p. 5.

<sup>10</sup> "Conservation for the People" by Kareiva and Marvier, *Scientific American*, 297:4, October 2007, pp. 50-57. Page p. 51.