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Weathering the Climate Crisis

SHEILA JASANOFF

Life in 1914 was by most measures a lot harder than it is in 2014 for the vast majority of the world's people. Without effective antibiotics and with only nascent knowledge of the causes of many diseases, stricken children and the vulnerable old had little hope of survival. The great influenza pandemic of 1918–19 killed some 50 million people worldwide. Polio mercilessly struck both rich and poor until vaccines were developed in the 1950s. At the dawn of the automobile age, cities were crowded and filthy, and long-distance travel was unreliable and slow. Refrigeration, enabling the delivery of food to distant markets and its preservation in the home, was still a distant prospect. In the public sphere as in the privacy of the family, women, half the global population, were woefully disenfranchised, as were ethnic minorities and indigenous peoples. They played no role in the decisions of state that were soon to convulse the so-called civilized world in an orgy of self-destruction. Although independence movements were stirring in imperial territories, colonialism still bestrode large swaths of Asia and Africa, and political self-determination remained a dream.

A child born in 2014 anywhere but the world's most impoverished regions enjoys much rosier prospects: a longer life, free from terrifying scourges such as cholera and polio; air fit to breathe and water fit to drink; increased mobility; political and social independence; and some degree of freedom to choose where to live and what kind of work to pursue. Yet all these emancipations have come at a price that could undermine the gains, in the worst case annihilating the very idea of civilization. That price is the threat of climate change. Slowly and silently, humankind's growing productive force over the past three hundred years—more people, more mobility, more agriculture, more industrial development—has spewed into the earth's atmosphere a collection of gases that trap heat and have converted the planet into a giant greenhouse. Whereas regular greenhouses shelter fragile plants from hostile environments, the planetary greenhouse, an unintended spin-off of technological achievement, threatens the human species with ruin.

UNCERTAIN SCENARIOS

Climate change could destroy agricultural productivity in parts of the world, making great regional famines once again a thing of the present. It might also breed new disease agents against which modern medicine offers no resistance. Carried by increasingly mobile populations, an epidemic that could have been contained a century ago might easily morph into an uncontrollable pandemic, a global contagion. More frequent extreme weather events could destroy cities that took hundreds of years to build and inflict economic and cultural devastation on unprecedented scales. With food supplies dwindling in many countries, and masses of environmental refugees on the move, political instability and war might no longer seem unthinkable, even in regions that have convincingly dedicated themselves to the pursuit of peace.

These scenarios are dire enough, yet each of them is built on a core of unknowability, suggesting that things could get even worse than currently imagined. Climate change has steered us onto unstable ground where, curiously, we know more about what is likely to happen on mass scales, and at vast spatial and temporal removes, than we do about what will happen soon, in our own backyards, to the communities and environments that each of us values most. This is not the most promising foundation for mid-range predictions about the state of the world

SHEILA JASANOFF *is a professor of science and technology studies at Harvard University. Her most recent book is* Science and Public Reason *(Routledge, 2012).*

a century ahead, but there are some trends we can identify with a fair degree of conviction.

First, we will almost surely know a good deal more about the climate a hundred years from now than we do at present. The historical record is encouraging for science. The Intergovernmental Panel on Climate Change (IPCC) published its first climate assessment report in 1990, and plans to issue its fifth in 2014. The causal connection between human activity and the warming of the earth's mean surface temperatures has strengthened from quite tentative to "extremely likely" over a quarter century. Knowledge has grown about regional phenomena, such as the Indian monsoon and the South American El Niño, as well as the possible impacts of climate change on specific components of the environment, such as glaciers, forests, and oceans. Older data, including rising monthly mean concentrations of carbon dioxide recorded since the 1950s at Mauna Loa observatory in Hawaii, which show seasonal fluctuations, make better sense in the light of new models and measurements that put such observations in perspective. With continuing investments in research, and the thickening of global knowledge networks, there is good reason to suppose that our understanding of the climate will grow in depth and sophistication for decades to come.

Second, we will almost certainly make measurable progress with technological efforts to curb and control climate change. Past attempts to predict environmental futures have consistently failed to make due allowance for technological innovation. Today, we know more than ever about the basic biology of life, and evolution to some degree has bent itself to human control. Prospects for creating crop plants and animals better fitted to human needs in a climate-altered world no longer seem fictional. Energy-related knowledge and know-how have also grown, from the design of efficient wind turbines and solar panels to projects for modifying the earth's surface to reflect radiant heat back into the atmosphere. In engineering as well as science, rising public and private sector investments suggest that new frontiers will be crossed, though it remains in dispute which frontiers, with what consequences, and how soon.

FRAGMENTED POLITICS

Third, local initiatives to mitigate or adapt to climate change will almost certainly intensify. We

are witnessing all over the world a rollback in the sovereign powers of nation states that arose with the birth of the Westphalian system in the seventeenth century. States no longer command the economic or political power to bind their citizens into unified imagined communities, able and willing to shoulder heavy burdens for the welfare of the nation. Responding to disasters such as hurricanes, wildfires, and typhoons, and lacking confidence in national governments' will to act, people are mobilizing around local concerns for safety and security. Weather after all afflicts everyone, even those suffering from climate fatigue.

Inward-looking movements include the turn toward eating food from close to home, cultivating locally renewable energy sources, creating incentives for more efficient household uses of energy, reducing automobile use, and increasing recycling. Cities have emerged as focal points for many of these initiatives. More politically manageable than nations, and more attuned to solving practical, day-to-day problems, cities are natural sites for a decentralized politics of climate change.

Forward trajectories in science, technology, and local initiative look like causes for optimism, but they do not necessarily bode well for peace and cooperation in the transition to a more sustainable world. Indeed, each site of greater awareness and activism brings new challenges for human solidarity and for the collective effort that will be needed to address climate change. In particular, while knowledge and technology may be consolidating the world, politics looks increasingly fragmented and cacophonous. The emergence of latter-day city-states, galvanized by citizens' fears of local environmental catastrophe, sits uneasily with hopes for vigorous cross-national collaboration.

Scientists, especially in the early years of the IPCC, trusted that their findings would facilitate international cooperation: The urgency of climate change, they thought, would motivate a global call to action. This firmly held Enlightenment belief in the power of knowledge foundered against the rocks of political reality. Science no longer holds the key to progress in politics. In its efforts to be "policy relevant" but not "policy prescriptive," the IPCC underestimated the conflicts that erupt when knowledge seeks to guide policy in contested domains. In 2009, an uproar caused by the disclosure of hacked e-mails from a prominent British

Climate change has put in question humanity's capacity to work together.

climate science research center helped derail international negotiations. Subsequent procedural housecleaning by the IPCC restored the integrity of its findings, but the episode revealed a wide gap between creating a global scientific consensus and making policies that commit nations to economically painful actions.

TECHNOLOGICAL FIX?

Pessimism about political leadership feeds a demand for technological solutions to climate change, but this path, too, promises to be rocky. Alternative energy sources emit less carbon. Yet, in technology as in policy, implementation lags behind imagination, hobbled by uncertainty, and by the mismatch between local risks and global benefits that plagues many forms of energy production. Advocates of nuclear power cite significant improvements in reactor technology, but cannot convince publics that the problems of massive scale-up and radioactive waste disposal are under control. Hydrofracking to release natural gas from rock brings fears of polluted water and devastated land. Clean technologies, notably wind and solar power, failed to turn hoped-for profits in their early decades of development; in the absence of clear benefits, American wind farms came to be seen as unnatural encroachments on treasured land- and seascapes. The utopian mega-project of turning the Sahara Desert into a huge energy source proved less tractable in practice than in contemplation. By contrast, oil companies have been able to find and exploit enough new sources to keep fuel prices relatively low, further dampening the demand for alternatives.

If fuel production remains conflict-prone, can technologies of remediation produce greater unity of purpose? This is the hope held out by proponents of geoengineering, a cluster of techniques aimed at counteracting anthropogenic climate change through deliberate large-scale manipulation of the environment. These include strategies for capturing and storing carbon above and below ground, as well as for brightening the earth's surface so as to reflect the sun's rays and reduce the warming caused by absorbed radiation. Therapeutic in intent, geoengineering strikes its supporters as an essential remedy for a desperately sick planet. At the same time, intervention on such a scale raises profound ethical issues, from the risk of inflicting unintended harm on unsuspecting people to the hubris of altering nature and playing god. Although analysts have tried to address these worries, geoengineering remains a strategy favored by powerful, industrially advanced nations that have the capacity to carry out massive, military-style operations. Geoengineering, in short, builds on and could exacerbate the deep inequalities of the present world order.

CONFRONTING THE FUTURE

Lastly, what future can we foresee based on the increasing turn toward local initiative? After Hurricane Sandy hit the eastern seaboard of the United States in October 2012, people told stories of strangers' acts of kindness in cities where transportation and communication systems had broken down. Emblematic of connection were the many little charging stations that people set up on their front stoops, using extension cords and circuit breakers to offer outlets to passersby who had no

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From *Current History*'s archives…

"The choice of mankind since the Treaty of Versailles is not a whit different from what it was before; a nation may dwell upon all the bitterness of this treaty and demand the execution, to the last comma, of all of the injustice wrapped up in certain of its terms. Some nations there are—France, for example—that are now pursuing this course and, unless arrested, will lead the way to a new and more dreadful war. Or a nation may seize upon the constructive and forward-looking aspects of it with determination to use them to the uttermost, and lead the way to peace. No nation is yet, unfortunately, doing this whole-heartedly. The nation best fitted to do it, America, has so far rejected its opportunity of world leadership, has considered its interests, its fears, and its rights, rather than its duties and responsibilities."

Ray Stannard Baker • "The Versailles Treaty and After," January 1924

HISTORY IN THE MAKING
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electricity and needed to charge their laptops or phones. Such practical acts restore faith in people's capacity for kindness and invention, but they also call attention to our extreme dependence on the energy infrastructures of modernity. Moreover, scale matters, and large resources have to be mustered to weather big needs, as in New Orleans in 2005 after Hurricane Katrina, Fukushima after the 2011 tsunami, or the Philippines after the 2013 typhoon. What would happen if devastation of such enormity became the order of the day in a world of isolated, ingrown enclaves, with no one prepared to offer relief to distant communities in dire need? And how much solidarity would the international community muster if populations least culpable in contributing to global warming, and least able to mitigate its effects, suffered the harshest consequences?

Climate change has put in question humanity's capacity to work together on a problem that strains political will as well as technological ability. Where we will be in a century depends in part on how we read the ethical obligation to confront the planetary future. Will it be seen as a mandate for stewardship and collective responsibility that transcends local particularity—or as an invitation to every place that can mobilize the resources to act for itself on its own steam?

In *One Hundred Years of Solitude*, his magical realist masterpiece, the Colombian novelist Gabriel García Márquez tells of the village of Macondo, which emerges from sleepy isolation to become a place of rapacious economic exploitation and vi-

olent conflict. Toward the end of the novel, four years, eleven months, and two days of steady rain wash away much of Macondo, along with the fortunes of the town's incestuous leading family, the Buendías. Eventually a great wind comes and Macondo is swept from the face of the earth, exactly as prefigured in an esoteric book: a metaphor, we might say, for our works of predictive climate science. The book is deciphered by the last of the Buendías, who recognizes too late that Macondo's fate was written a century before. ∎

From the archives of *Current History*…

HISTORY IN THE MAKING
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"The end of the Cold War and the seeming passing of the threat of Communism should not lull us into a sense of contentment. The implications for global economic and political security of an increasing gap between the haves and the have-nots should be obvious. Terrorism and political chaos take their toll no less than does the clash of competing superpowers."

Joseph F. Stiglitz
"Trade and the Developing World: A New Agenda"
November 1999