geoengineering schemes, with the exception of the burial of intentionally charred biomass (*5*). Later—perhaps reflecting an evolution of thought during the writing of the book and an expression of the inventor in him—he argues that we now have little option but to try various geoengineering schemes to moderate what he feels are the inevitable dire consequences of "global heating."

Do we do ourselves and society a disservice by ignoring Gaia? Are the intuitions of a planetary physician a more accurate prognosis for the future than those produced by supercomputers created by multidisciplinary teams of scientists? Climate scientists acknowledge the uncertainties of their projections and are working diligently to reduce them. But are we properly incorporating the feedbacks between climate and a globally potent biota? And do we even have time to refine these models? Lovelock thinks not. He calls for an immediate shift of focus to adaptation to a hothouse world, expecting that in the coming decades humanity will be forced to migrate to the few habitable refugia that remain (including the British Isles). The world population will be reduced from billions to millions, Gaia selecting those humans with the traits to live sustainably (her revenge). Models might come to serve an important alternative role even in this crisis phase, if and when it comes. Shifting from long-term projections to medium-term forecasting, future models with proper planetary physiology might identify the harbingers of the approach of a climate threshold, and if coupled to an expanded network of Earth observations, do so before it is too late.

In the end, Lovelock doesn't want to be viewed as a fearmonger and pessimist: "I am not a willing Cassandra and in the past have been publicly skeptical about doom stories, but this time we do have to take seriously the possibility that global heating may all but eliminate people from the Earth." This is a planetary physician's intuition rather than a projection from an integrated assessment model. Do we ignore it, or fill his prescription and call him in the morning?

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COMPUTERS

Civic Collaboration

Ben Shneiderman

Wiki Government
How Technology Can Make Government Better, Democracy Stronger, and Citizens More Powerful
by Beth Simone Noveck
Brookings Institution Press, Washington, DC, 2009. 246 pp. $28.95, £20.99. ISBN 9780815702757.

Conservatives and liberals alike will find things to cheer and things to fear in the upcoming changes to American political processes. Technology-mediated civic participation, electronically enhanced collaboration, and download-verifiable open government are rebalancing the power structure in federal, state, and local governments. At the same time, open journalism is empowering the universal investigative reporter while undermining the traditional news media.

Just as first movers have advantages that are respected by venture capitalists, first developers in political innovations deserve attention because they are ahead of the crowd. Beth Noveck went from law professor to user-interface designer for the Peer-to-Patent system, which allows public volunteers to provide guidance to the U.S. Patent Office. Getting the usability and the sociability right, she created a Web-based environment for experts in arcane patent issues to speed the work of patent examiners by discussing and selecting the ten most important examples of prior art. You might think that patent applicants, especially major companies, would fear having their patents turned down, but weeding out bad applications early and strengthening good patents benefits everyone. Noveck's emphases on interface design to promote participation and visualizations to provide feedback are increasingly recognized as the foundations for successful engagement of diverse users.

The author's good judgment and deserved success inspired many Peer-to-Patent imitations around the world. Now, she looks to bring similar benefits to other government processes, which she gets to do in her role in President Obama's Office of Science and Technology Policy. *Wiki Government* describes in detail how Noveck made Peer-to-Patent work and offers lessons for other federal agencies. Her tight, lawyerly writing provides a well-argued and fact-filled promotion of "expertocracy," the ways in which experts can contribute their narrow skills to specific problems.

All this makes for good reading and inspiration, but her case could be broadened by showing how these ideas work at more local levels, down to home owner associations. And although Noveck focuses on ways of engaging experts to provide their knowledge, there are additional means through which technology-mediated social participation can be put to work:

Citizen reporting of problems—through such systems as AMBER Alert, storm trackers, earthquake damage reports, forest fire alarms, and electronic suggestion boxes at government Web sites—has already demonstrated its value. More effective reward structures and increased social recognition could substantially expand the use of these avenues.

Volunteer service contributions have traditionally taken the form of material donations after disasters or participation in projects at museums, hospitals, schools, parks, and the like. Web sites such as http://serve.gov and http://nationalservice.gov now facilitate these service efforts. The Web can also be used to distribute tasks among volunteers, as in NASA's clickworkers site for image analysis of martian craters.

Public education (e.g., on personal health, flu pandemics, energy conservation, or environmental protection) can be promoted through well-designed user experiences and effective social norms.

Community building, at every level, is fostered by the rapidly growing social media and ubiquitous cell phones with their increasingly rich services. Communities can become energized by modern electronic versions of parent-teacher associations, neighborhood watches, and disaster planning teams.

Noveck summarizes her case in her closing paragraph: "Ordinary citizens have more to offer than voting or talking. They can contribute their expertise and, in so doing, realize the opportunity now to be powerful.… Collaborative governance is an idea whose time has come." Let's make it happen soon.

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