STEP AHEAD

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Contents

Notes from the Editor.......................................1

Forum Opinion

Mark Stephen: *Good Science + Good Politics = Legitimate Policy Influence* 2

Regina Axelrod: *Nuclear Scientists in Eastern Europe* . . . 3

Features

Roger D. Masters: *Science in the Policy Process* 3

George J. Busenberg: *Wildfire Policies in the United States: The Past, Present, and Future* 7

Troy Abel: *Average Science Politics and Environmental Justice*...*9*

Book Reviews 11

News of the Discipline..................................20

Notes from Editor

The theme of this issue of *STEP Ahead* is "Science in the Policy Process." The theme should bridge the interests of almost all STEP members, most of whom are interested in the role of science in policy. Environmental policy happens to be one area where science plays a huge role, so it provides a good platform for debating the issue. I would argue that we do not currently have a very good understanding of the role of science in the policy process; the question needs much more theoretical and empirical work. Obviously the ideas in this newsletter will not provide the answers, but hopefully they will fuel some thought.

The forum pieces and feature articles offer an interesting mix of perspectives on this question. Some authors offer normative views on the subject; how *should* scientists become involved in the policy process. Others draw on substantial policy experience to draw lessons about what really happens when an academic dives into policy. Research projects that focus on the link between science and policy, for example, wildfire ecology and the US Forest Service, provide further insights. All three perspectives—normative, experiential, and research—are necessary for understanding the question.

Thanks again to all contributors, editors, and staff. The Fall 2005 edition will be published before the APSA meetings. Please send any ideas for themes, contributions, or news to the editor.

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FORUM OPINION

Good Science + Good Politics = Legitimate Policy Influence

Mark Stephan, Washington State University Vancouver

For those who study or work in an area of the natural sciences or social sciences that has clear implications for public policy there is a tendency to think of such work as a Hobson's choice. Either researchers have to maintain objectivity and neutrality in order to do "good science" and therefore ignore the underlying political dynamics inherent in policy work, or researchers have to wade into the muck and think strategically, opening themselves up to the charge that they are not real scientists, but instead advocates for a particular ideological standpoint. Depending on where researchers stand, one of the choices given above will be unacceptable and arguably both choices are less than appealing. Defined in this way, scientists and the work they do are undermined no matter what choice any individual researcher makes. Yet it seems to me that there is a way to get around this conundrum, a process by which scientists can have their science and policy impacts too.

A necessary but not sufficient condition is that scientists use transparent and accessible methods to analyze their data and discuss their findings. Critical in terms of this transparency is not that any layperson in the general public can understand the material, but that other researchers in that same subfield can have the minimal competence to evaluate it. For example, if I am a researcher studying an issue such as climate change it must be done in such a way that peer review is possible. This should sound familiar to most readers because it is in fact the way we do research that finds its way into peer reviewed journals in our respective fields and subfields.

When it comes to the policy process, researchers need to be willing and able to situate their work in the larger milieu of public policy. This includes not only allowing others under certain circumstances to take their research conclusions and run with them for purely political reasons (e.g., when a congressional committee cites a research paper as part of an attempt to push a particular policy agenda), but also a willingness to bring attention to cases where their research conclusions are being wildly distorted and manipulated to such an extent that the original research is unrecognizable. To say it another way, *researchers have an ethical and political responsibility to see that their work avoids becoming a vehicle for policy advocacy that ignores the initial grounding of the research*. It is politically and morally irresponsible for researchers to claim that once the work is published and in the public domain, they have no further responsibility for how it is used in the political arena.

There is a corollary to this argument. Not only do scientists have a responsibility for their own research and how it gets used, but they also have a responsibility to call attention to those who would use faulty research methods in order to reach preordained conclusions. There are those who claim to use science to build their arguments on the mantle of objectivity when in fact their intent is to wrap their arguments in scientific rhetoric in order to give the arguments some sense of legitimacy. An example of this can occur when, in response to a striking new report on a subject, (be it new data in the field of genetics, an environmental science concern, or a related policy area) all of the sudden there is a research project that pops up that has drawn equal and opposite conclusions. Invariably these "counterstrikes" are meant to serve particular political requirements and whatever claims to scientific objectivity are at the least, questionable. In sum, faulty scientific research can undermine the legitimacy of the policy impacts of good research and scientists do themselves a disservice not to shed light on the faulty work that exists.

Certainly there are organizations such as the Union of Concerned Scientists who are already working to bolster the integrity of research used in policy arenas, but this does not excuse the rest of us

from acknowledging the political uses of our work. It seems far too easy for academics to work in their ivory towers and ignore the reality that surrounds them. We have a responsibility to do more.

FORUM OPINION

Nuclear Scientists in Eastern Europe

Regina Axelrod, Adelphi University

I am continuing my research on nuclear power in the Czech Republic and the development of harmonized guidelines for nuclear safety and radioactive waste disposal in the EU. The two areas joined when the Czech Republic became a member of the EU last May.

The Temelin nuclear power plant, located in the Czech Republic (35 miles from the Austrian border) is a Russian designed reactor upgraded by Westinghouse that received operational licenses in 2000 and 2002. (There are two reactors). I have been investigating how the decision was made to upgrade the plants from a political and decision-making perspective. The role of nuclear scientists appeared to be very important. Because the issue was technological and complex, there was a tendency to deflect opinion about whether a nuclear option was desired to the experts--the nuclear scientists. Government officials responsible for decision-making claimed they did not have sufficient information or knowledge of the issues and deferred to the experts as they did not feel competent.

Many nuclear scientists agreed, saying politicians and even the public had no legitimate role in deciding whether nuclear power was desirable or safe. According to some scientists and regulators (who may be the same persons as regulators and promoters of nuclear energy and often occupy the same seat), politicians also use fear to manipulate the public against nuclear power. The regulators maintained that the biggest threat was the possibility that anti-nuclear groups and politicians could instill fear of the nuclear option among the public.

The question is: What is the appropriate role of the public in decision questions of energy use, i.e. nuclear power? Equally important, is the issue of the influence of scientists and their use of information to influence political and government officials who are responsible for making decisions in the public interest.

FEATURE ARTICLE

Science in the Policy Process

Roger D. Masters

My experience over the last few years concerning environmental issues on which I've come to be considered an "expert" may provide helpful information on what to do when involved in the policy/legal process. First, it is appropriate to explain the role of academicians on scientific matters not understood by most citizens, government administrators, and elected officials. That is, how did I become an "expert" on issues linking toxic chemicals and public water supplies to human behavior and health (an area that seems unrelated to political science)? And second, once expertise has been recognized, what have been some of my practical experiences and how can they provide insights for others in our profession.

I. **How Do You Get to Be an Expert?**

In the policy process, there is a difference between "experts" (that is, those with scientific information not based on the question at stake) and "parties" (that is, those who take one side or another based on their preferences, self-interest, or citizen concern) to debates over judicial or legislative decisions. It is obvious, however, that interested parties often cite scientific evidence and claim

expertise. As a result, many people tend to deny that there is such a thing as an impartial expert.[1]

My own experience may help provide an answer to such skepticism. As a political theorist who studied with Leo Strauss and was known for analyzing and translating the works of Rousseau, the importance of understanding human nature was long obvious to me. Almost 30 years ago, I attended a meeting at which a retired oil executive discussed his discovery that blood levels of lead and manganese were significantly higher among violent criminals than for other citizens. It struck me that this could mean the environmental pollution with these toxins could be a serious factor increasing local rates of violent crime. Because confirmation of this hypothesis would both reveal an important environmental factor in behaviors often attributed to either genes or familial experience and indicate an important area for public policy concern, I sought and gained EPA funding for a study of industrial pollution with lead or manganese as factors in higher crime rates.

Multivariate epidemiological methods (such as multiple regression models like those I'd used in earlier studies of politicians' nonverbal behavior) confirmed the hypothesis. As I'd come to understand how lead and manganese interfere with essential neurotransmitters such as dopamine or serotonin, indicating plausible mechanisms linking the absorption of these toxins to violent behavior. Publication of these findings[2] had unpredictable effects. A press release caught the attention of Rush Limbaugh, who on air made fun of the Ivy League professor who claimed that pollution caused crime.

Source: David Horsey, Seattle-P.I., Originally published February 15, 2005

A retired chemical engineer, Myron J. [Mike] Coplan, heard this program and called me to ask if I had ever studied the effects of using hydrofluosilicic acid (H_2SiF_6) or sodium silicofluoride (Na_2SiF_6) to "fluoridate" public water supplies. Based on his professional experience (which included designing reverse osmosis to separate hydrofluosilicic acid from other residues in the production of phosphate fertilizer), Mike knew this compound was highly toxic and had been astounded to realize it was being added to the water in Natick, Massachusetts, where he lives.

Collaboration with Mike led to extensive studies applying epidemiological methods to assess the effects of exposure to water treated with these silicofluorides, which are now used in treating public water supplies delivered to about 45% of the American population even though they have never been tested for safety. In 1999, our first peer-reviewed publication showed that where these chemicals are used, children are significantly more likely to absorb lead from environmental exposure to leaded paint in old housing or high lead levels in

[1] When working my way through college, for example, I remember a co-worker who defined an "expert" as "any s. o. b. from out of town." More recently, after testifying as an expert witness in a case in California, I realized that the "out of town" part of this definition had been satisfied when I stepped off the airplane and joked that my expertise was established because some neighbors and colleagues at home consider me an s.o.b. Once actually involved, however, establishing your status as an expert and providing impartial scientific information is NOT a joking matter.

[2] Masters, R., Hone, B, and Doshi, A. (1998). "Environmental Pollution, Neurotoxicity, and Criminal Violence," in J. Rose, ed., *Environmental Toxicology: Current Developments* (London: Gordon and Breach, 1998), pp. 13-48; Masters, Roger D., with Baldwin Way, Brian T. Hone, David J. Grelotti, David Gonzalez, and David Jones, "Neurotoxicity and Violence," *Vermont Law Review*, 22 (1998), 358-382.

water.[3] Subsequent articles confirmed this association and found similar links between silicofluoride use and behavioral dysfunctions linked to lead (including especially higher rates of violent crime, substance abuse, and learning disabilities).[4] This matters because an EPA administrator stated in 2000 that "they were unable to find any information on the effects of silicofluorides on health and behavior," confirming other evidence that our research was the only independent assessment of the safety of treating public water supplies with these chemicals.[5]

Thus I came to be viewed as an "expert" by working with a brilliant scientist, publishing numerous peer reviewed publications, and participating in many scientific meetings. Reliance on Mike Coplan's expertise was essential, most especially because he did not hesitate to criticize *me* for technical errors in stating the chemistry involved in the issues under discussion. It became obvious that I needed to admit publicly my lack of scientific knowledge on matters of chemistry, and to focus my own statements on the use of multivariate statistics to establish the epidemiological risks and the reasons for a Moratorium on the use of silicofluorides until they have been demonstrated to be safe. In so doing, it has been important to admit that should future studies demonstrate that any of our published findings are in error, I will retract them.

In short, expertise is most likely to rest on extensive peer reviewed publications and is greatly strengthened by collaborative research with a specialist in other scientific areas related to the issues. Admission of the limits of one's knowledge is important, but so is luck and openness to new information. Finally, the ability to discuss your findings with journalists with great precision and clarity – making possible media coverage in appropriate publications[6] – is invaluable.

II. **Personal Experiences**

Perhaps because I have reached Emeritus status, without concerns about job status, it's been possible to devote substantial amounts of time to a variety of activities that most tenure candidates would find impossible. Collaboration with a scientist from another field is an obvious example, but the following activities have been essential in establishing the relevance of our published findings:

1) Contacts with the media.
2) Contacts with lawyers
3) Testimony in a court cases (sworn deposition before a notary public preparing testimony in court).
4) Testifying at a committee hearing of a Committee of a State Legislature.

[3] Masters, R. and Coplan, M., "Water Treatment with Silicofluorides and Lead Toxicity," *International Journal of Environmental Studies*, 56 (1999), 435-49.

[4] Masters, R. and Coplan, M., "A Dynamic, Multifactorial Model of Alcohol, Drug Abuse, and Crime: Linking Neuroscience and Behavior to Toxicology," *Social Science Information*, 38 (1999), 591-624; Masters, R.D., Coplan, M. J., Hone, B.T., and Dykes, J.E., "Association of Silicofluoride Treated Water with Elevated Blood Lead," *Neurotoxicology*, 21 (2000), 1091-1100; Roger D. Masters "Biology and Politics: Linking Nature and Nurture" in Nelson W. Polsby, ed., *Annual Review of Political Science*, vol. 4 (2001), pp. 45-369. Myron J. Coplan and Roger Masters. "Guest Editorial: Silicofluorides and Fluoridation," *Fluoride: Quarterly Journal of the International Society for Fluoride Research,* 34 (2001), 161-220; Masters, R.D., "MacLean's Evolutionary Neuroethology: Environmental Pollution, Brain Chemistry, and Violent Crime," Gerald A. Corey Jr. & Russell Gardner Jr., eds. *The Evolutionary Neuroethology of Paul MacLean* (Westport: Praeger, 2002), pp. 275-296 (Ch. 15); Roger D. Masters, "Neurotoxicology and Violence," in Richard W. Bloom and Nancy K. Dess, eds., *Evolutionary Psychology and Violence: A Primer for Policymakers and Public Policy Advocates* (Praeger/Greenwood, 2003), Ch. 2, pp. 23-56; Masters, Roger D. "Science, Bureaucracy, and Public Policy: Can Scientific Inquiry Prevail Over Entrenched Institutional Self-Interest?" *New England journal of Political Science*, in press (2005)

[5] Letter from Robert C. Thurnau, Chief, Treatment Technology Evaluation Branch, Water Supply & Water Resources Division, USEPA, to Roger Masters, Nov. 16, 2000.

[6] E.g., Wilson, Jim. "The Chemistry of Violence," *Popular Mechanics*, (April 1999), pp. 42-43.

5) Drafting statements for all of the above, sharing them with colleagues, and revising them to correct errors.
6) Contacts with potential "allies" in legal or political conflicts: environmental organizations, individual congressmen, influential journalists, or others worth contacting.

THIS CAN MEAN SEVERAL HOURS A DAY ON THE PHONE AND E-MAIL.

These activities often require travel and hence are facilitated if one has an adequate income, time, and energy to engage in dialogue presenting scientific findings without bias.

One aspect, which became evident early in our activity, is the need to confront criticisms from those whose position is challenged by your findings. Proponents of water fluoridation did not hesitate to dismiss our findings as "junk science." Two EPA chemists attacked our first publications, focusing primarily on theoretical chemistry without accurately stating our hypothesis and dismissing the association between silicofluorides and higher children's blood lead with dubious methodological criticisms of the medical data we used.[7] Perhaps because replications and extensions of our research could be said to answer fully such criticism, few other scientists have challenged our publications. Hence, within the last month, a dentist at the CDC's Division of Oral Health[8] used the Urbansky-Schock memorandum criticizing our first publication as the sole evidence against our series of papers (notes 3 & 4), numerous presentations to professional meetings,[9] and a detailed rejoinder to the Urbansky-

[7] Edward T. Urbansky and Michael R. Schock, "Review of work by Roger Masters and Myron Coplan about the effects of common water utility fluoridation practices on (1) lead concentrations in drinking water and (2) the bioavailability of lead," Memorandum thru Robert C. Thurnau to Stan Laskowski, Director, Region III Environmental Services Division, EPA (Jan. 14, 1999). Since our publications did not depend on a claim that silicofluorides increase "lead concentrations in drinking water," much of this memorandum is not relevant to our main findings. At this early stage in our research, when Urbansky and Schock turn to our first publication (above, note 3) it is to dismiss our findings as "an unfortunate coincidence" (p. 8) based on published data from a Dartmouth-Hitchcock Medical Center study of children's blood lead levels in Massachusetts that "would not met EPA's quality control/quality assurance standards" because blood was sampled by "a wide variety of personnel" (p. 9). This and other methodological complaints imply that a state-wide sampling of children's blood lead could be based on methods typical for a small laboratory study. Urbansky and Schock also complain that in the Dartmouth-Hitchcock blood lead survey for Massachusetts, there was "no effort to correlate an individual building/house with blood lead levels" (p. 10) – ignoring that the percentage of old housing is sufficient for measuring this variable in epidemiological research. Since our subsequent research replicated the Massachusetts findings with data from surveys in New York state and the National Health and Nutrition Evaluation Survey III (counties over 500,000 population), our findings were clearly no mere "coincidence" nor were the methods in blood lead surveys untypical of standard practice for assessing risks associated with various socio-economic, demographic, and environmental factors. Because this Urbansky-Schock criticism of Jan. 1999 was originally routed through Robert C. Thurnau of the EPA's National Risk Management Research Laboratory, Thurnau's letter of Nov. 2000 (note 5 above) provides evidence that the EPA itself did not view the work of Urbansky and Schock as providing "information on the effects of silicofluorides on health and behavior." In any event, the National Toxicology Program subsequently nominated the silicofluorides for study for both chemical reasons and "lack of toxicity data": *Federal Register*, Vol. 67, No. 113 (June 12, 2002), pp. 40329-40333.

[8] FAX from Dr. William Bailey (Divison of Oral Health, National Center for Chronic Disease Prevention and Health Promotion, CDC) to Bernie Lucy (Feb. 15, 2005), used as by the Department of Environmental Services of the State of New Hampshire as evidence dismissing the proposal for a Moratorium on silicofluoride usage: letter of Feb. 23, 2005 from Rene Pelletier, Manager, Land Resources Management, D. E. S. to Rep. John Alger of the N. H. State House of Representatives.

[9] E.g., Masters, R.D. and Coplan, M.J. "Silicofluoride Usage and Lead Uptake," Presentation to XXIInd Conference of the International Society for Fluoride Research, Bellingham, Washington, August 24-27, 1998; Masters, R. D., "Poisoning the Well: Neurotoxic Metals, Water Treatment and Human Behavior," Plenary address to Annual Conference of the Association for Politics and the Life Sciences," Four Seasons Hotel, Atlanta, GA (September 2, 1999); Coplan, M. J., Masters, R. D., and Hone, B. (1999a) "Silicofluoride Usage, Tooth Decay and Children's Blood Lead," Poster presentation to Conference on "Environmental Influences on Children: Brain, Development and Behavior, New York Academy of Medicine, Mt. Sinai Hospital, New York, May 24-25, 1999; Coplan, M.J., Masters, R.D., and Hone, B., "Association of Silicofluoride Treated Water with Elevated Blood Lead,"

Schock criticism).[10] In short, be prepared for criticisms that may not pay attention to the full range of your work or to standards of balanced scientific inquiry.

A second aspect, however, concerns the views of those who might stand to benefit from your findings. Those hostile to the "fluoridation" of public water supplies have, like supporters of the policy, long ignored the specific chemicals used for the purpose. Hence before our publications, neither side in the policy debate mentioned the difference between sodium fluoride (which was tested for safety) and the silicofluorides. Although over 90% of water fluoridation now uses silicofluorides, the anti-fluoridationists continue to focus primarily on the harmful effects of fluoride. Indeed, in response to a journalistic report that one American community was shifting from hydrofluosilicic acid to sodium fluoride as the chemical for fluoridation, one anti-fluoridationist communicated by email that this was evidence of the risk of relying on our work. In this view, the issue seems to be "all or nothing at all," so that our results are often not emphasized and sometimes misrepresented (e.g., by claiming that contamination with lead in the main reason for harmful effects associated with silicofluorides – a claim we did not make because, at the actual level of dilution, such contamination could not account for harmful effects which in any event do not fit the data results we have published.

The bottom line is that to be an expert, you'll need to work exceptionally hard, to focus with great precision on getting your statements *exactly* right, to expect that even in this case you may be attacked on spurious grounds (sometimes from both sides of the issue), and above all to keep your temper. Also, however, it will help to make connections others have missed. At a recent Hearing of the Public Safety Committee of the California Assembly, after a series of brilliant presentations on manganese and violent crime, in my remarks I noted the high costs of imprisonment to taxpayers (e.g., cutting a city's crime by only 50 events would save that community over $1,250,000 in the first year) – and was told this practical conclusion was helpful to the Committee's members. Over all, remember that your principal concern is the common good of our society, not "winning" a case or argument – and that it's essential to be scientifically accurate, presenting your evidence clearly and without exaggeration.

Poster presentation to 17th International Nerotoxicology Conference, Little Rock, AR, October 17, 1999; Roger D. Masters, "Science, Bureaucracy, and Public Policy: Can Scientific Inquiry Prevail Over Entrenched Institutional Self-Interest?" presentation at the annual meeting of the Association for Politics and the Life Sciences, Montreal, Que. (August 19-23, 2002); Roger D. Masters, "Toxins and Behavior: Implications of 'Toxicogenomics' for Public Policy," Paper presented to XXth International Neurotoxicology Conference, Little Rock, ARK, Nov. 19, 2002; Roger D. Masters, "The Hidden Handicap: Lead, Brain Chemistry, and Educational Failure," Paper presented to 2004 Annual Meeting of the American Political Science Association, Chicago, IL., Sept. 3, 2004.

[10] Myron J. Coplan and Roger D. Masters, "Response to EPA Staff Unsupportable Dismissal of Evidence of Adverse Silicofluoride Health Effects," June 12, 2000.

FEATURE ARTICLE

Wildfire Policies in the United States: The Past, Present, and Future.

George J. Busenberg
University of Colorado at Denver

Wildland fires pose a major challenge for American environmental policy in the 21st century. Wildfires can burn millions of acres of land in a single year, thereby causing ecological damage on regional scales (as well as damage to human communities located in or near fire-prone wildlands). Unfortunately, the cumulative effects of American wildfire policy <u>increased</u> the risk of wildfire damages over the course of the 20th century. In many American ecosystems, flammable organic materials (fuels) accumulated over time when wildfires were suppressed. Yet for more than

five decades, American wildfire policy supported a national program of wildfire suppression that was not matched by a complementary program of fuel reduction. The policy of wildfire suppression therefore allowed the progressive accumulation of wildland fuels across large scales in America, encompassing many millions of acres of land. These large-scale fuel accumulations (consisting of dense structures of living and dead vegetation) have greatly increased the risk of damaging high-intensity wildfires in America.

This article discusses the results of two studies by the author concerning American wildfire policy. The first study examines the policy processes that led to the failure of American wildfire policy in the 20th century, with a focus on the policy network of organizations active in U.S. wildfire management. The second study proposes a policy strategy designed to improve the effectiveness of American wildfire management in the 21st century. The results of the first study were published by the author in a 2004 article entitled "Wildfire Management in the United States: The Evolution of a Policy Failure," *Review of Policy Research* 21(2): 145-156. The results of the second study were published by the author in a 2004 article entitled "Adaptive Policy Design for the Management of Wildfire Hazards," *American Behavioral Scientist* 48(3): 314-326.

The study in *Review of Policy Research* constructs a model of the origins and propagation of policy failures, and applies this model to examine the failure of American wildfire policy. Policy failures (or policy errors) are defined in this study as policies that fail to achieve their central goals. For example, American wildfire policy failed to achieve the central goal of reducing wildfire risks across the nation. The policy failure model builds on the punctuated equilibrium theory by proposing that (1) policy errors can be incorporated into the fundamental issue definitions (and associated institutional arrangements) established during a period of punctuation, and (2) these errors can then be progressively reinforced in subsequent equilibrium periods, as policy networks progressively seek out new resources to pursue established issue definitions and institutional arrangements. The failure of American wildfire policy can be traced back to a period of punctuation (1905 through 1911) when the federal government established an issue definition of aggressive wildfire suppression and the institutional arrangements necessary to implement this policy. This policy choice focused attention on wildfire suppression while failing to focus attention on wildland fuel reduction. The wildfire suppression policy was ultimately self-defeating, because the resulting wildland fuel accumulations would eventually increase the risk of fire damages. Yet this policy error was subsequently reinforced for more than five decades, as the wildfire policy network progressively gained new resources to support the wildfire suppression policy. In essence, the institutional legacy of wildfire suppression created the dangerous ecological legacy of accumulated wildland fuels and high wildfire risks.

Because severe wildfires fed by massive fuel accumulations can overwhelm all attempts at suppression, the reduction of future wildfire risks will require the reduction of wildland fuels on large scales. Yet the challenge of reducing these fuel accumulations poses major uncertainties, as fuel reduction has never been attempted on such large scales before. The study in *American Behavioral Scientist* builds on the concept of adaptive policy design (adaptive management) to develop a strategy for resolving the uncertainties surrounding large-scale fuel reduction projects. Adaptive management is a strategy meant to generate both learning and adaptation in public policy. Learning in public policy is defined as the application of new ideas and information to policy decisions. Adaptation in public policy is defined as a dynamic process of policy reform that improves the fit between the goals and the methods of policies over time. Adaptive management is envisioned in the literature as a long-term process of learning and adaptation accomplished through large-scale policy experiments. This extended process of large-scale experimentation is designed to reveal the dynamics of interacting natural and social systems (dynamics which are often fully evident only across large

scales and long periods of time). An adaptive policy design for the management of wildfire hazards would aim to determine the most effective methods of fuel reduction through a systematic process of policy experimentation. In particular, this adaptive policy design would use a number of policy experiments on large scales (millions of acres of land in total) to test different approaches to wildland fuel reduction over long periods of time (years to decades). In essence, the scale and duration of these fuel reduction experiments would reflect (in microcosm) the dimensions of the wildfire problem in America.

These long-range fuel reduction experiments could be configured to help meet the short-range demands of wildland firefighting. In particular, the experiments could be configured to create limited areas of reduced fuels (fuelbreaks) designed to interrupt the spread of high-intensity wildfires while the experiments are underway. Fuelbreaks are designed to aid wildland firefighting efforts (and limit wildfire damages) by acting as barriers that slow or stop the spread of fires across landscapes. Fuelbreaks have seen extensive use in the chaparral ecosystems of California as a method to contain the spread of wildfires. In the context of adaptive management, various fuel reduction experiments could be deliberately spaced as a mosaic of fuelbreaks across forested landscapes. Furthermore, these fuelbreaks could be strategically located to protect human communities in or near fire-prone wildlands. Adaptive wildfire management could thereby combine a long-range strategy for discerning the most effective methods of fuel reduction with a short-range strategy for containing the spread of wildfires.

The history of American wildfire policy reveals enduring interactions between the ecological dynamics of fire-prone ecosystems and the political dynamics of the institutional arrangements designed to manage those ecosystems. Ideas and institutions established in the early 20th century set in motion self-reinforcing policy processes that created the hazardous accumulations of fuel now found in many American ecosystems. In turn, the elevated wildfire risks posed by these fuel accumulations have led to a series of recent policy reforms meant to expand fuel reduction projects. The historical experience of American wildfire policy suggests the distinct possibility that ecosystems and institutions will continue to interact in this policy domain in the future. Therefore, the success of future wildfire management efforts in America may well depend on a process of learning and adaptation that attends to the dynamics of interacting social and natural systems in this policy domain.

FEATURE ARTICLE

Average Science Politics and Environmental Justice

Troy Abel
University of Wisconsin - Green Bay

Since the late eighties, numerous publications debated the validity of statistical associations between pollution and race and whether they revealed environmental injustices, inequities or even racism. In an exemplary case of scientific policy design processes, most existing Environmental Justice (EJ) studies—pro and con—focus on over specified questions about statistical associations between environmental hazard locations and minority communities. Consequently, the most recognized empirical studies on both sides suffer from coarsely rendered national or regional resolutions of pollution burdens instead of smaller-scaled risk evaluations that could inform community-based environmental injustice remedies. This brief essay sketches an alternative research agenda that informs environmental justice policy design and previews a larger project with an analysis of metropolitan St. Louis.

In the 1980s, sociologist Robert Bullard introduced environmental policy makers and social scientists to a distributional scrutiny of race and pollution that became commonly know as environmental justice analysis. While this work set

the stage for research at the intersection of civil rights and environmental issues, the methodological roots of EJ analysis can be traced to the 1987 study by the United Church of Christ's (UCC) Commission for Racial Justice. With cross-sectional data, their research found that zip codes hosting hazardous waste landfills had, on average, double the percent minority of postal areas without such sites by statistically correlating the coincidence of environmental pollution and socioeconomic variables. Most studies that followed aligned themselves into two camps in a divided scientific issue network.

On the one hand, those EJ policy proponents whose studies concluded that environmental injustice is widespread presumed that people living closer to pollution sources experienced more exposure and therefore, more risk. But proximity and even pollution release amounts tell us nothing about relative risk. On the other hand, those skeptical EJ studies who don't find statistical differences at national or regional levels of analysis tend to imply that environmental injustice is a myth based on faulty research design. This inference ignores the fact that the environmental inequities and risk disparities may be context specific to particular neighborhoods or communities. This essay uses metropolitan St. Louis to show how research can integrate risk characterization and community-level analysis that fosters a better connection between EJ analysis and remediation.

Data and Methods

In a larger study available by request, I analyzed the spatial patterns of Toxics Release Inventory (TRIs) facilities and surrounding demographics for the census defined St. Louis Metropolitan Statistical Area (see Figure 1). Within 1 km of a TRI site, minority residential concentrations averaged nearly 40% compared to 25% elsewhere. The differences more than doubled between the 1-2 km ring and beyond (33.8% to 15.4% minority) and then began declining in the remaining increments. Median household incomes were just over $20,000 for the nearest neighbors of a TRI facility but doubled to $42,000 beyond 5 km. Nonparametric statistical tests rejected the null hypothesis that these racial differences arose by chance in five out of six distance intervals indicating that minority and low income populations, on average, were closer to polluting facilities. Yet, such a finding illustrates one of the great deficiencies in conventional EJ research.

Most studies in both camps of the issue network maintain a methodological commitment to statistical techniques that focus on average cases when practitioners and publics will be more interested in outliers. Therefore, I am exploring the application a risk characterization tool developed by the EPA's Office of Pollution Prevention and Toxics (OPPT). The Risk-screening Environmental Indicators Model (RSEI) begins with multiple chemical releases from TRI facilities and simulates their air dispersion in relation to census populations, estimates downwind concentrations, produces a surrogate dose, and calculates a relative risk indicator. The RSEI model allowed the ranking of 246 facilities and their air releases of more than 126 toxic air pollutants across the St. Louis region.

More than seventy-percent of the region's pollution risk was generated by ten facilities that were mostly located in the Illinois counties of metropolitan St. Louis; or Metro-East as its known locally(see Table 1). For instance, the Shell Wood river refinery reported releases of more than forty tons of chromium compounds characterized in the RSEI simulations as the riskiest release over a decade and it accounted for more than ninety percent of the facilities risk profile. Three St Clair facilities (Big River Zinc, Cerro Copper, and Solutia) ranked among the ten worst in pollution risk and could be found concentrated on the southern border of one of the most socially vulnerable community's in the region; East St. Louis, IL. According to the 1990 census, the population of 40,944 was 98% African-American; 25% were unemployed; and 48.8% lived below the poverty level. From 1987-1997, these facilities released over 32 tons of lead compounds, 493 tons of sulfuric acid, and 2,920 tons of hydrochloric acid that sum to a risk load eclipsing any other community across the entire St. Louis region.

Unfortunately, this concentration of some of the greatest pollution risk disparity in all of St. Louis would never be uncovered in any conventional EJ analysis. While academics will devote great attention to the history or spatial scale of the average geographies where pollution and minorities coincide and their methodological commitments; the policy analysis sketched out here can help decision makers identify practical opportunities to reduce disproportionate environmental burdens across communities. Not all pollution is created equal and at the very least, the very worst toxic pollution sources seem like good candidates for the whole host of "third generation" environmental management tools like collaborative technical assistance, pollution prevention, and voluntary environmental performance incentives.

BOOK REVIEW

Margaret Pugh O'Mara**.** 2004**.** ***Cities of Knowledge: Cold War Science and the Search for the Next Silicon Valley.*** Princeton, NJ: Princeton University Press.

With the Soviet Union's collapse in 1991, the end of the Cold War opened up new vistas for the study of U.S. science and technology policy. *Cities of Knowledge* presents an historical analysis of an interesting and ongoing phenomenon: the rise of research parks dedicated to science and technology (S&T) development. Such research parks are considered major economic change agents within state, local, and especially metropolitan areas. Two examples of the "gold standard" for such endeavors are Silicon Valley associated with Stanford University and Route 128 around Boston (with its S&T roots in MIT and Harvard). The book describes and analyzes case studies of research parks affiliated with three universities: Stanford University, the University of Pennsylvania, and the Georgia Institute of Technology (Georgia Tech). The first of these research parks flourished, while the other two proved much more problematic and fragile enterprises.

Margaret O'Mara's larger thesis is that the rise of the research park to economic and political prominence rests upon a foundation of Cold War S&T policies, traditional American federalism and localism, and racial politics. The Cold War was an intense competition between the U.S. and the Soviet Union, but it also fueled a continuing struggle *within* American politics for achieving economic growth. After the Korean War began in 1950, the U.S. embarked on a new era in domestic politics—large-scale military expenditures, especially research and development funding, flowed into those universities capable of providing or attracting skilled professionals to work on defense projects. At first, the professionals were the university faculty and its graduates. Later, the research park attracted professionals from other sources. Initially, distribution of those new funds tracked experience during World War II—the elite universities received disproportionately large sums, further advantaging those institutions in the quest for sustained scientific and technological excellence. Their advantage was that federal moneys allowed those universities to remain at the cutting edge while potential competitor universities struggled. Traditional pork-barrel politics were not considered acceptable given the critical nature of the new technologies for national defense. Universities outside this charmed circle therefore had to make themselves or their surrounding areas attractive. Stanford led the assault in part because it was unusually advantaged in terms of owning developable land: the Farm. What the Stanford Research Park (originally the Stanford Industrial Park) provided was ample space, quiet and pleasant surroundings, and access to social amenities. The new research parks were modeled on a university campus environment, quiet with ample green space, the antithesis of the city.

The influence of the Department of Defense was obviously great because of, first, the funding it provided and, second, its requirement that critical facilities be dispersed due to the threat of nuclear attack. Dispersion allowed for survival of a larger percentage of the national infrastructure, meaning

that new locations would not be in the urban areas but rather the suburbs. Thus, the move to suburbs was further fueled by placing high-paying jobs out in the suburbs, further undermining city finances and social diversity by removing white professionals from the mix. American federalism came into play in that various states and localities within the states actively competed for locating the new facilities in their area—that competition included provision for land in the suburbs, tax rebates and infrastructure development such as new roads. In a sense, these early competitions were rehearsals for the later 1960's and 1970's intense competitions for large-scale industrial facilities such as auto plants. By contrast, research parks were particularly attractive because they were clean industry with very high-paying jobs. The economic synergies were considered excellent. However, the development of research parks raised questions about the politics of equality in that the parks were routinely placed in white suburbs, which were seen as more congenial to the technologists and scientists who populated such locations, as explicitly occurred in the Stanford case. This racial component became even clearer in the other two situations, Philadelphia and Atlanta, which occurred in urban areas. In order to create usable space for new facilities, urban renewal became the mechanism—a process clearly designed to remove minority and low-income populations from the desired areas. The result in Philadelphia was divisive racial confrontations, which basically stymied development plans. Atlanta, with Georgia Tech, was similar, although there the politics changed as the African-American population took control over the mayor's office but the city operated in a state dominated by white segregationists. In both instances, affluent white suburbs, where the research parks were developed ultimately, ringed the cities stifling their growth. In these latter cases, the universities became engines of change but largely lost control over its development. Stanford, with its land endowment, was unique in that the land could not be sold, so control (a condition of the Stanford Trust) was maintained, which created the campus aesthetics so prized in research parks.

Professor O'Mara's research is well documented; the participants in those more innocent times were willing to speak of their social and racial agendas in terms of the neighborhoods and the anticipated effects of having knowledge workers move into the area. The social dynamics were class-based, but the ultimate effects were racial given existing occupational and income structures in the different communities. The author's thesis is two fold: first, the research park concept helped prevent the development of the garrison state within the United States despite the enormous impact of defense spending—the S&T structure was kept diffused and civilianized, and second, through these cities of knowledge the structure of both American cities and universities were dramatically changed. Stanford and the Silicon Valley became the gold standard, reflecting an unusual situation, incapable of being duplicated elsewhere. Regardless, multiple universities have sought creation of their own research parks in an effort to build research capabilities while driving high-tech economic growth in the region. That latter facet, high-tech growth, is why state and local governments are so aggressive in supporting such efforts.

The larger social question raised by Professor O'Mara is whether the research park concept fostered by universities helped perpetuate the segregated American society especially its metropolitan areas. By siphoning off high-paying jobs and creating an academic-style ghetto in the suburbs, the ultimate effect may be high-tech growth with great unacknowledged social cost. Regardless, research parks are a developmental concept that has spread well beyond the boundaries of the United States. In fact, fifteen years ago, at the request of a journal editor, I wrote a short commentary on the research park concept that was published in a journal sponsored by the Chinese Academy of Sciences.

O'Mara's book is well written, overcoming its birth as a dissertation, and provides much to think about as universities (including my own) plunge into the research park business. For those interested in the development of post-WW II American S&T policy, this is a must-read book. It

brings into the foreground the factors driving S&T policy by moving outside the confines of the universities themselves and their military paymasters.

---Roger Handberg, Department of Political Science, University of Central Florida

BOOK REVIEW

R. Michael Alvarez and Thad E. Hall. 2004. ***Point, Click and Vote: The Future of Internet Voting***. Washington, D.C.: Brooking Institution Press.

The aftermath of the 2000 general election, particularly with regard to the difficulty of vote counting in Florida, highlighted an essential issue associated with the heart of American democracy—the right to vote. Whose votes get counted? Who gets left out? In their book, *Point, Click and Vote: The Future of Internet Voting*, R. Michael Alvarez and Thad E. Hall focus on the possibility of increasing voting opportunities for people who have historically had a difficult or impossible time casting a ballot. Those who have had a difficult time effectively voting in the past include those who serve in our armed forces abroad, citizens who work in other countries, individuals with disabilities, and those who find it very inconvenient to get to the polls, i.e., young people and those with family/work responsibilities.

Political scientists of many different fields will find this book and topic of interest. It highlights several issues of scholarly import. First, it raises big questions about democratic theory: Is democracy, in part, defined by whose votes get counted and whose votes don't? What is the role of voting in our democratic system? What is the effect of voter disenfranchisement on representation? Second, it is particularly pertinent to those who study election and voting processes. It does a nice job of summarizing the issues associated with early voting, absentee ballots, voter registration, and an evaluation of the various voting technologies that we currently use. Third, it raises important questions about federalism. The U.S. Constitution has left the matter of managing elections to the states. The authors raise interesting questions about the appropriate balance between federal coordination, mandates and regulation with the preference and precedent of local control. Fourth, and of most relevance to those interested in science and technology policy, we see very interesting issues with regard to how we evaluate emerging technologies and their role in public institutions. It explores the potential pitfalls and benefits with regard to this particular technology. Increasing enfranchisement is carefully weighed against security risks such as virus attacks motivated either by punk hackers or terrorists, by the equity issues of the digital divide, and the possibility of furthering disintegration of civic life in the United States. And finally, policy makers, election officials and policy analysts will be most interested in the final chapter where Alvarez and Hall vigorously argue that Internet voting has the potential to solve many of the pressing problems in U.S. elections, offering several concrete solutions to explore the true depth of major obstacles in the way of Internet voting and how to address them.

These solutions are the core of the book's primary argument. This argument is quite straight forward, "There is no way to know whether any argument regarding Internet voting is accurate unless real Internet voting systems are tested, and they should be tested in small-scale, scientific trials so that their successes and failures can be evaluated." (p.10). Alvarez and Hall press for the need for real experiments. They distinguish between the use of trials (they describe in detail Internet voting trials in Alaska, Arizona and Oregon) and the need for scientific experiments with control and treatment groups. This is the only way, they argue in solution #1, to provide useable data to truly evaluate the success or failure of Internet voting. They also propose in solution #2 that there should be a federal program that provides grants to states for Internet voting experiments. Assuming that the benefits will outweigh the risks

and that Internet voting shows promise, they argue for solution #3: Internet voting should be treated as a "development process, a transition from how elections are run now to how they will be run in the future. Going from where the country is today—when many citizens are still forced to vote on antiquated voting systems like lever and punch card machines—to real Internet voting cannot and should not happen overnight." (p.150). Solution #4 calls for the use of the Internet to promote deliberative democracy. They argue that deliberative democracy improves civic life, improves communication between government and citizen and makes government more effective. By solution #5 they finally get to the need for more research on Internet voting security. It may be the case that support for many of these earlier solutions would depend on the results of solution #5, and by addressing this issue head-on, we could determine whether or not investment in these other solutions would be fruitful. The final two solutions are quite grand-scale. First, they discuss the need for resolving the legal issues involved in making Internet voting possible. These would require the coordination of substantial institutional changes across states and an increasing federal involvement in state and local election administration. Second, they address the need for eliminating the digital divide—a tall order by any standard.

While their "solutions" range from the currently "implementable" (increased funding for security research and small scale experiments with Internet voting), to testable hypotheses (that deliberative democracy improves participation, communication and effectiveness), to hopelessly optimistic (coordinated institutional change in states and eliminating the digital divide), these "solutions" nonetheless bring to the forefront an urgent policy problem that has gotten little scholarly attention. In summary, do not mistake this book for one that is narrowly construed to advocate the use of Internet technology in our electoral systems, but rather as one that raises central questions about the nature of American democracy.

---*Carol L Silva, Bush School of Government and Public Service, Texas A&M University.*

BOOK REVIEW

Fred E. Foldvary and Daniel B. Klein (eds.). 2003. ***The Half-Life of Policy Rationales – How New Technology Affects Old Policy Issues***. New York: New York University Press.

This collection of 13 articles with an introduction by the editors addresses the intriguing question of how new and emerging technologies can affect well-established areas of public policy. The papers were first presented at a February 2000 conference on "Technological Advance and the Changing Context of Public Policy Justification," sponsored by the Center for Science, Technology, and Society at Santa Clara University.

The premise is that as technology changes, the rationale for policies must change as well. The faster the change, the "shorter the intellectual half-life of government policies will be," which leads to the basic question of whether technological change generally enhances the case for one kind of policy over another. The editors are candid in stating that the evidence marshaled by the contributors leads to the tentative conclusion that: "*Technological advancement tends to enhance the case for free-enterprise policy*" (emphasis in original).

Although the preference for free-enterprise policy alternatives was established *a priori,* the topics address a range of concrete policy issues where technological change has the potential to alter earlier practices. These are clustered around four general themes: metering, excluding, and charging (marine fisheries, lighthouses, highways, parking, air quality); quality assurance and consumer protection (banking, consumer protection, medical licensing); natural monopolies (electricity, water, postal services); and other policy areas (business practices, endangered species). Most of

these policies affect us every day, be they highway travel, selection of a doctor, banking, buying safe toys, or even finding a parking place. The technologies include remote sensing and warning devices, electronic monitoring and surveillance tools, and of course, the Internet and computers.

The authors eschew the more conventional approach of analyzing how technological innovation affects society and policy in favor of an explicit normative stance that argues innovations in technology "ought to persuade policymakers to implement reform in the direction of free enterprise." Taken together, these pieces provide a provocative effort to link routine and well-established areas of public policy with technological changes and how these might open the door to free-enterprise approaches. This is the book's greatest strength and its greatest weakness.

Its strength is based on the unabashed and unapologetic preference for free-market solutions to issues many regard as already resolved. The great weakness is that it seeks to understand, shape, and implement policy based on a single variable, the free-market. Most of the contributions treat policies as if they had no history, no constituents, no political life, and no actors with a stake in maintaining the status quo. The naïve optimism that regards technological change as a vehicle for opening the door for market approaches is likely to crash hard on the realities of politics, behavior, and indeed, economics. These realities involve competing notions of access to public benefits, equity, fairness, as well as clashing views about the proper role of government, contending groups, and the actual—as opposed to idealized—behavior of individual citizens.

For example, to argue, as Shirley V. Svorny does, that information available on the Internet provides citizens with sufficient information about doctors' performance to eliminate state licensing requirements is to ignore who controls this information, how reliability and validity are assured, and the level of individual sophistication required to interpret medical information in timely and useful fashion. To shift rather abruptly from open access to privately managed toll roads based on electronic control mechanisms (Peter Samuel) minimizes the historical expectation that most roads will be free to travelers and that governments will be reluctant to cede income from existing toll roads to private operators. If, on the other hand, technology and the market can combine to help with parking problems (Donald C. Shoup), then by all means, let's give it a try.

At one level, then, the editors and authors are to be commended for their efforts to explore the links between technological change, policy, and market mechanisms. At another, however, their explicit normative preference for free market outcomes sharply limits exploration of the full range of policy alternatives. The reality is that social, political, economic, and technological systems are complex and rarely yield to a single preconceived policy preference. The ideological commitment to free market outcomes stands in sharp contrast an open-minded willingness to tangle with the ambiguities and political uncertainties that unfold when changing technologies challenge established public policy.

---*Lauriston R. King, Ph.D. Program in Coastal Resources Management, East Carolina University*

BOOK REVIEW

James Gustave Speth 2004. ***Red Sky at Morning: America and the Crisis of the Global Environment. A Citizen's Guide for Action.*** New Haven, CT: Yale University Press.

Perhaps like the old maritime adage "…red sky at morning, sailor take warning," Gustave "Gus" Speth, the Dean of the Yale School of Forestry and Environmental Studies, has written a broad-ranging and sometimes powerful warning of the real environmental challenges facing the world today. Speth provides a combination of historical

context, contemporary conception and misconception, and projections to the future to issue the warning, making the case that humans and human activity have produced an enormous threat to the environment. Embedded in book is an implicit challenge to the expectation that technology will save humankind. Organized into four major sections, the book first examines how challenges to the environment have moved from what was once thought of as mainly local and national concerns to global ones. What the book may lack in detail and originality, it more than compensates for by virtue of having been written by Dean Speth, whose resume of environmental activism and experience is perhaps unequalled.

With emphasis on ten global scale concerns – ozone layer depletion, climate change, desertification, deforestation, loss of biodiversity, population growth, freshwater resource depletion, marine environmental deterioration, toxification, and acid rain, Speth then launches into a review of the mainly international efforts to address these global environmental problems. His bottom line in this review is that the endeavor has largely been a failure. The third section then makes a valiant effort to summarize an enormous amount of research to examine the root causes and "drivers" of environmental deterioration.

After touching upon population growth, consumption, technology, poverty, market failure, political and policy failure, the scale of global economic enterprise, the growth-at-all-costs imperative, and basic social values and habits of thought as drivers, Speth attempts to provide a plan for attacking each. So he develops the idea that there is a core group of "transitions" that must be promoted in order to reverse environmental degradation. These transitions – toward a stable and smaller world population, toward significant reductions of mass poverty, toward adoption of environmentally benign technologies, toward "environmentally honest prices," toward sustainable consumption, toward improved knowledge and environmental learning, toward improved "good governance," and toward a caring, nurturing, and sustaining culture – are all necessary conditions for altering the current path of environmental degradation. The final section, a "Resource of Citizens," represents a call for action and an outline of some of the ways that people who are concerned about the global environment can get involved.

Those who are trying to find detailed discussions of the science, technology, or public policy issues surrounding the environment and sustainability will probably find this book to be a disappointment. Many of the environmental problems discussed in the book are touched upon only superficially. Most of the drivers of environmental degradation, as debated and controversial as they may be, are treated in an equally superficial way. Those who are looking for a rather sweeping and comprehensive picture of the challenges that lay ahead to achieve sustainability will probably find this book highly useful. Indeed, those of us who long for a work in the spirit of William Ophuls' *Ecology and the Politics of Scarcity*, which has been out of print for many years now, Speth's book fills an enormously important gap.

---*Kent E. Portney, Tufts University*

BOOK REVIEW

Robert Durant, Daniel Fiorino and Rosemary O'Leary (eds.). 2004. ***Environmental Governance Reconsidered.*** Cambridge, MA: MIT

Bureaucratic administration has been criticized for a long time, from numerous quarters. The principal charges brought against it have been and continue to be inefficiency, ineffectiveness and a subversion of democratic politics. These charges have surfaced repeatedly against environmental regulation since its ascendance in the 1970s, and have increasingly gained traction in the emergence

of regulatory reform. Market-based incentives and pollution trading, devolution, regulatory negotiation, collaborative planning, and environmental dispute resolution are just some of the reforms pushed by market-oriented analysts as well as participatory democrats as policy antidotes to the supposedly faltering logic of hierarchical, technocratic administrative rationalism.

In light of the above observations, editors Robert Durant, Daniel Fiorino and Rosemary O'Leary in their book *Environmental Governance Reconsidered* have brought together an interesting and compelling examination of these conceptual and administrative developments critical to the field of environmental politics.[11] Their examination rests on the presupposition that a justifiable consensus is emerging on the inadequacy of conventional, command-and-control regulatory approaches to environmental and natural resource problems and that a new "second generation" of environmental and natural resource policy reforms has emerged in response. Durant and his colleagues argue effectively that the time has come for these new policy reforms to be understood within a theoretical framework centered on the desirability of results-based policy grounded in common understanding of problems. Towards this end, their book pursues three general goals by re-examining: 1) critical concepts necessary to justify the ends of environmental polices, 2) policy reforms designed to address deficiencies in first generation policies through democratic empowerment of stakeholders, and 3) policy reforms designed to address deficiencies in first generation policies rooted in centralized, bureaucratic, administrative rationalism.

The first goal of reconceptualizing the purpose of environmental governance is pursued in separate chapters on the concepts of sustainability, global interdependence, the precautionary principle, common pool resource theories, and environmental dispute resolution. Sustainability and global interdependence raise enormous challenges to the prospect of second-generation environmental governance. Striving to establish a sense of common purpose is difficult enough in local – regional contexts where the parameters of cultural values, historical reference points and the distribution of political power are at least somewhat manageable. But applied to the global level, where capital is increasingly mobile, and cultural heterogeneity and radical inequality are givens, achieving a sense of common purpose becomes a task of Sisyphean proportions. Neither Robert Paehlke nor Gary Bryner are naïve about this, and both offer in their respective chapters, useful suggestions about the potential for progress in results-based policies promoting sustainability in a global world. Durant and Edella Schlager build convincing cases around the central importance of the precautionary principle and common pool resource (CPR) theory to promoting effective environmental governance. It remains to be seen, however, how effective advocates of the precautionary principle will be at overcoming Promethean Optimism, or how effective CPR theory will be at guiding the emergence of sustainable management regimes for transboundary resources at the global scale.[12] But in the end, what other choice do we have to address threatened global interests but to try to create results-based international policies grounded in a sense of common purpose? The future as predicted by William Ophuls is a sober reminder of at least one possible alternative in the absence of any sense of common purpose.[13]

The challenge of achieving common purpose around these vital environmental concepts relates to policy developments taken up in the second part of *Environmental Governance Reconsidered* entitled "Reconnecting with

[11] Robert Durant, Daniel Fiorino, and Rosemary O'Leary, eds. *Environmental Governance Reconsidered* (Cambridge MA: MIT Press, 2004).

[12] See John Dryzek's characterization of "Promethean Optimism," the belief that ecological limitations are either non-existent or surmountable given technological innovation and or resource substitution as driven by the price mechanism in *The Politics of the Earth* (New York: Oxford University Press, 1997).

[13] William Ophuls and A. Stephan Boyan Jr., *Politics, Ecology and Politics of Scarcity Revisited: The Unraveling of the American Dream*. (New York: H.W. Freeman and Co., 1992.

Stakeholders." The promise of marshalling discursive rationality in the cause of results-based environmental governance is significant, and receives serious treatment by James Meadowcraft in his chapter on deliberative democracy. A central challenge to policy mechanisms that seek to achieve discursive rationality is strategic behavior of unequal discussants. Various methods of empowering environmental advocates to be effective participants in a range of contexts of policy deliberation are usefully addressed by Dewitt John in his chapter on civic environmentalism, Evan Ringquist in his chapter on environmental justice, and by O'Leary, Nabatchi and Bingham in their chapter on environmental conflict resolution. An interesting addition to this section is a chapter on property rights by Charles Wise. Wise rightly notes that the probability of constructing common purpose often depends upon a clearer understanding of the intersection of protecting public interests and infringing on individual rights. Towards this end, he provides a cogent review of the current state of the evolving regulatory takings doctrine.

The book's third goal - redefining administrative rationality - is covered by chapters focusing on devolution, regulatory flexibility, pro-active, preventive techniques to reduce pollution, and environmental auditing as policy strategies to address the dysfunctions of centralized bureaucratic decision-making (typically understood as inappropriate uniformity of rules, diminishing returns on effort, and problem displacement).[14] A combination of centralization and de-centralization of decision-making contingent upon circumstances is likely to improve effectiveness and efficiency of environmental governance, a point ably made by Denise Scheberle in her chapter on the implications for devolution in improved environmental protection. But while devolution and increased localized flexibility in environmental regulation may improve efficiency and effectiveness of solutions to localized problems, they may also reduce the leverage needed to encourage polluters to clean up their behavior, or lead environmental advocates to compromise the scope and scale of their ambitions. Fiorino and Ken Geiser address these problems in their respective chapters. Finally, Jan Mazurek examines the promise and limitations of independent auditing of industry efforts to minimize the environmental impacts of their production processes.

While criticism of command and control regulation is largely justified, the question I'd like to ask is to what extent does the viability of second generation policies as effective responses to environmental problems rest upon the historical and political contexts of first generation policy responses? That is, to what extent would second generation reforms be possible or desirable absent the precedence (or potential re-emergence) of heavy-handed regulatory regimes? Bureaucratic decision-making and enforcement clearly have their limits. And second-generation policy reforms promise to move environmental progress forward once the point of diminishing returns on regulatory investment begins to occur. What is less clear is the relationship between first generation regulations and their second-generation offspring.

I pose this question because the authors of *Environmental Governance Reconsidered* concede that the inadequacy of bureaucratic solutions to environmental problems is only partially grounded in inherent dysfunctions of administrative rationality; part of the problem plaguing agency efforts lies in the indifference and outright hostility from various quarters of the political system to the ends of environmental governance. It is unclear how successful new modes of policy decision-making and implementation will fare in converting these forces to the green platform.

Yet like the authors of the book reviewed here, I see these as risks worth taking. Capitalism, democracy and ecological sustainability deserve to be seen as compatible projects. It has been noted elsewhere that while the discourse of ecological modernization has achieved firm footing in Europe, it has yet to seriously emerge in the American

[14] See Douglas Torgerson and Robert Paehlke, eds. *Managing Leviathan: Environmental Politics and the Administrative State*. (Petersborogh: Broadview press, 1990).

context.[15] *Environmental Governance Reconsidered* should be considered a sophisticated effort to focus academic and professional thought in a direction conducive to an American form of ecological modernization.

Finally, given that the biases of this book (like my own) run along the lines of pragmatic rationalism, it should be acknowledged that important contributions of idealist, non-rationalist, ecocentric voices have been and continue to be made to the debate over appropriate relationships between human and nonhuman organisms, and social and ecological systems. Deep Ecology, eco-feminism, and other radical perspectives are absent from *Environmental Governance Reconsidered.* This sin of omission is unfortunate, but not sufficient in my opinion to preclude this work from attaining - and deserving - a wide audience.

--- *Jerald C. Mast, Carthage College*

BOOK REVIEW

Rabe, Barry G. 2004. *Statehouse and Greenhouse: The Emerging Politics of American Climate Change Policy.* Washington, D.C.: Brookings.

In this volume Barry Rabe seeks to document and describe the various policies at the state level that abate climate change gasses. State level policies that reduce climate change emissions are worthy of study. This is because the U.S. is the prime source of anthropogenic carbon dioxide – the key greenhouse gas. The U.S. accounts for 25 percent of the world's emission of this gas. Additionally, the U.S. is close to the leading, if not the leading, per capita emitter of carbon dioxide. Finally, state level policies that abate carbon dioxide emissions are particularly germane because the federal government has opted to forego any direct effort to reduce such emissions. Rabe does not demonstrate, however, that these policies represent "the emerging politics of American climate change policy" as he avers in his title.

As a number of works have documented (e.g., Tarr 1996), state and local governments have historically been very active in the abatement of air pollution.[16] They have done so primarily to protect the state and local business milieu from the negative effects of excessive air pollution (Dewey 2000; Gonzalez 2005).[17] Some of the climate change abatement policies that Rabe (e.g., those in Atlanta) points to are clearly part of the continuing efforts of states and localities to abate localized air pollution. (In contrast to such localized air pollution as smoke from the burning of coal or smog from vehicles, carbon dioxide is invisible and odorless.) Therefore, these policies have little to do with climate change concerns – beyond arguing that they also reduce greenhouse gas emissions.

The most salient climate change gas abatement policies outlined by Rabe are those in California and the northeast. This is of no great surprise since these regions have historically been leaders in the setting of air pollution abatement policies (Ringquist 1993; Gonzalez 2001; Potoski 2001).[18] Given this history, the pertinent question is whether the carbon dioxide reductions achieved in these states were the result of policies that were designed to reduce localized air pollution to enhance the local business climate, or were these policies explicitly designed to abate climate change emissions? Unfortunately, Rabe does not consider this question in his study.

In 2002, California did adopt a law

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[15] John Dryzek and David Schlossberg *Debating the Earth* (New York: Oxford University Press, 1998).

[16] Joel Tarr 1996, *The Search for the Ultimate Sink*, University Press of Akron.

[17] Scott Dewey 2000, *Don't Breath the Air*, Texas A&M University Press; George Gonzalez 2005, *The Politics of Air Pollution*, State University New York Press

[18] Evan Ringquist 1993, *Environment Protection at the State Level*, M.E. Sharpe; George Gonzalez 2001, *Corporate Power and the Environment*, Rowman & Littlefield, chap. 6; Matthew Potoski 2001, "Clean Air Federalism", *Public Administration Review* 61, no.: 335-342.

specifically targeted at reducing carbon dioxide emissions from automobiles. This law, however, does not take effect until the 2009 model year. Similarly, in 1990 the California Air Resources Board (CARB) promulgated a vehicle zero emission plan, whereby in 1998, two percent of automobiles sold in the state were to be zero emission vehicles, five percent by 2001, and 10 percent 2003. With the automobile industry complaining about the costs of the program, the California zero emission plan was postponed to 2008 and its targets reduced to 250 alternative fuel vehicles, 2,500 in 2011, and 25,000 by 2014 (Hakim 2003).[19] With its long compliance timetable, it is entirely likely that California's 2002 carbon dioxide reduction law will replicate the fate of the CARB 1990 vehicle zero emission plan, and end up being symbolic.

Rabe writes that the American "states have clearly positioned themselves to achieve significant reductions in greenhouse gas emissions" (p. 109). This outcome, however, is highly uncertain.
-- George A. Gonzalez, University of Miami (Fla.)

NEWS OF THE DISCIPLINE

Upcoming Request for Proposals

Brave New World 2005 Postgraduate Conference
Manchester, United Kingdom: April 30, 2005

Upcoming Conferences

American Society for Public Administration National Conference
Milwaukee, WI: April 2-5, 2005

National Technology and Social Science Conference
Las Vegas, Nevada**:** April 6 - 8, 2005

Midwest Political Science Association National Conference
Chicago, IL: April 7-10, 2005

Second Conference on Online Deliberation: Design, Research, and Practice
Stanford University, CA: May 20-22, 2005

[19] Danny Hakim 2003 April 25, "California Regulators Modify Auto Emissions Mandate", *New York Times*, p. A24).