STEP AHEAD

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Contents

Notes from Editor

My original announcement for this issue of *STEP Ahead* asked for opinions and research summaries on a very simple topic: the influence of technology on politics. Looking back on this request, with the current submissions in mind, it is obvious that I was being laughingly naïve. The concept of "technology" is one of "those" concepts, the type of concept with fuzzy boundaries and multiple interpretations, the type that can leave researchers on supposedly focused conference panels scratching their heads, wondering how on earth these papers are related.

Of course, as all of the articles in this newsletter make clear, the fuzziness of the concept of technology contributes to making it politically interesting. The concept can be twisted and reinterpreted for political purposes. The political process affects how technology and technological ideas are used, and vice versa. The relationships between technology and politics tap into fundamental questions of political science. Hence, technology and politics is a virtual goldmine of research questions that can increase the relevance of the STEP community to the broader discipline.

Thanks again to all contributors, book reviewers, editors, and staff. Please send any ideas for themes, contributions, or news to the editor. I am especially interested in more focused themes, where somebody is willing to suggest a list of appropriate contributors.

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FORUM OPINION

A Nanotech Velvet Revolution? Issues for Social Science Inquiry

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There does not appear to have been a general announcement, nor a grand meeting or convention, but by whatever means such things happen, the nanotechnology community seems to have selected the Industrial Revolution as its official Historical Analogy, the era in the past with which it will always be compared. Although by no means the first, perhaps the most prominent reference came in the first National Nanotechnology Initiative (NNI) budget request to Congress, from the White House Office of Science and Technology Policy, which bears the subtitle, "Leading to the next Industrial Revolution" (U. S. OSTP, 2003). According to Google, there are now more than a *half million* articles, reports, and web sites that characterize nanotechnology research and development as "the new," "the next," or "another" Industrial Revolution. So, there it is. While some may believe that they were working on the Next Space Age or a New Renaissance, the bulk of nanotech scientists and engineers regard themselves as, in effect, reintroducing machinery to the world. And, in an important sense, they probably are.

It is safe to assume that this reference was meant to be taken positively. Certainly, no one—least of all OSTP—would deliberately try to associate nanotechnology with images of appalling working conditions, ruthless exploitation of labor, or widespread environmental devastation, even though such episodes were also very much a part of the legacy of industrialization. (Beaudoin, 2003; Hobsbawawm, 1999; Mokyr,1999). On the other hand, it is hardly wise to ignore them. Any "revolution," even one that seemed completely justified to those initiating it, or that over time turned out well (such as, say, the American Revolution) is still an ugly, messy, ungainly affair that is, at best, under only the partial control of its purported leaders. For all the good it may ultimately bring, it is also, inevitably, the cause of much misery and suffering. Seen in this way, use of the word "revolution" (a political term, by the way) to describe the social, economic, and, sometimes, physical distortions that often accompany the introduction of major new technologies—nuclear weapons, automobiles, computers—even those that (on balance) have proven beneficial, seems rather apt.

It is by no means unusual for an engineer or (especially) an investor involved with an emerging technology to get defensive over questions of its possible negative impacts. After all, stories of such impacts are often used by those who wish to limit the use of some technologies, or ban them altogether (see Florman 1982, 1997). Thus, one of the more remarkable—not to mention commendable—features of the NNI has been its attitude regarding such issues. Indeed, the nanotech community has not just been open to discussing potential negatives, it has moved proactively to try and identify—and address—these problems, earlier than ever before, and in spite of the efforts of opponents who are seeking a moratorium on this research (Bailey, 2003; Weiss, 2004). Toward that end, they have actively recruited—and even funded—scholars from the social sciences and humanities, and initiated a number of public outreach and education programs.

In short, the promoters of nanoscale science and engineering are hoping, through ventures like the NNI, to create a new kind of revolution, one that will be very different from that other Industrial Revolution (or, at least, its more disagreeable aspects). The best political analogy would probably be the so-called Velvet Revolution that occurred in Czechoslovakia during November and December 1989. Although the revolt began when riot police beat a group of student demonstrators, the actual resignation of the Communist government was achieved through peaceful negotiation, without violence, and with no casualties. Naturally, there were—and still are—problems caused by the

Revolution (for one thing, the country almost immediately split into two nations in what, of course, came to be known as the Velvet Divorce). Even so, it stands as a fine model.

Can the introduction of nanotechnology be a Velvet Industrial Revolution? The rhetoric certainly sounds good, and the nanotechnology community seems to be operating with the best of intentions. Unfortunately, one question remains: what have we *done*? Nanoscale scientists and engineers have been promising a veritable (choose the metaphor) "flood," "avalanche," and "cornucopia" of new consumer products, along with a vast panoply of new industrial materials and processes that, we have been told, will revolutionize medical care, computing, telecommunications, and countless other industries. When is this going to happen? Will those officials responsible for public health and safety, or for environmental quality, be ready? This is clearly a matter of great concern for the public at large, but it may become a major bottleneck for nanoscale industries as well.

Under U. S. law, for example, all medicines—as well as all "medical delivery devices"—must be approved by the Food and Drug Administration (FDA) *before* they are allowed on the market. It is not too difficult to imagine a scenario in which some new, potentially beneficial drug (or a nanoscale delivery device), produced after years of effort and at great expense, is ready for use in patients, is delayed simply because the government does not yet have a procedure in place for approving it, or the administrative capacity to handle a flood of new innovations. In a similar vein, is the Environmental Protection Agency ready for the emergence of not only hundreds (or even thousands) of new products, but whole new industrial processes—not to mention (at least) dozens of totally new industries—many of them employing technologies not seen before, and even some in which not all of the basic physics and chemistry are completely understood.

Revolutions, even velvet ones, are invariably messy. They are also rich with areas of inquiry. We have posed but a few of many questions those who study technology and public policy can and should address at this early stage of technological development.

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FORUM OPINION

The Gap Between Neuroscience and Public Policy: Case Studies of Environmental Toxins, Brain Chemistry, and Behavior

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It is increasingly evident that growing knowledge linking brain chemistry to new techniques of "treating" behavioral disorders is creating a dangerous gap between science and public policy in the United States. This note illustrates the problem by summarizing four cases in which legislative and administrative decisions have been divorced from theories and data linking neuroscience to human behavior (either because policy-makers have ignored evidence contradicting the rationale for their decisions or because these decisions have unexpected effects that are hard to explain without reference to genetics, neurotoxins, and available treatment techniques).

ONE: Although this example may seem at first merely of academic interest, it also concerns a current policy issue of national importance. Despite extensive biological evidence linking lead to violent behavior, sociologists and criminologists paid no attention to neurotoxicology when confronting the sharp drop in U.S. rates of violent crime following 1991. Given prior evidence of higher blood lead levels in individual violent offenders and an association between lead pollution and local rates of violent crime, was the ban on leaded gasoline involved in this historical trend? This easily tested hypothesis is based on neuroscientific research since lead downregulates the neurotransmitter dopamine, which plays an important role in regulating behavior (i. e., what is conventionally called "self-control"). Although annual sales of leaded gas were not correlated with violent crime rates for the same year, their correlation with violent crime rates 17 to 20 years later was consistently over r = .90 (with an even stronger relation to rates of violent crime by young offenders), suggesting prenatal exposure to fumes of leaded gasoline as a causal factor in lowering violence. This finding has important contemporary policy implications because manganese gasoline additives may have similar consequences to those that seem likely for leaded gasoline. On the one hand, violent offenders have often been found to have higher than average levels of manganese as well as lead in their blood. And on the other, manganese lowers the function of the neurotransmitters dopamine and serotonin, thus making possible a loss of behavioral inhibition leading to violent behavior similar to that observed for lead. It follows that technologies of gasoline additives can have behavioral effects that impose immense costs on the public, outweighing benefits to the automobile industry yet ignored by both policy makers and the general public.

TWO: The case of gasoline additives is paralleled by a general failure of our educational system to consider the effects of lead on cognition. Since the association between higher blood lead and lower individual IQ scores is well established (and indeed was recently found to occur below the traditional "threshold" of 10µg/dL of blood lead), it would seem reasonable to consider this factor in assessments of a school district's educational outcomes. To test this hypothesis, epidemiological methods were used to study community averages on Massachusetts' standardized educational tests in a number of different subjects and grades. Controlling for 15 or more variables (such as size of community, ethnicity, or unemployment rates), the strongest variable predicting community averages in all tests studied was the percentage of children with

over 10µg/dL of blood lead. Since Benjamin Franklin was aware of comparable losses of cognitive ability due to lead toxicity, it is worth asking why such policies as "No Child Left Behind" are being formulated and administered without reference to the association between environmental pollution and neurodevelopmental disorders. One answer comes from interviews with young teachers, who confess they have never heard anything about brain chemistry and neurotoxins as a factor in poor educational performance or learning disabilities.

THREE: Parallel issues arise in the diagnosis and treatment of ADHD as well as in gene/environment interactions in the etiology of autism or asthma. For example, identical behavioral deficits can be associated with a gene (e.g., the DAD2 receptor mutant that Ken Blum has associated with ADHD) and neurotoxins (e.g., lead, which as noted above also interferes with dopamine, the neurotransmitter whose function in crucial brain circuits is reduced by the DAD2 mutation). Since screening for the presence of genes or the bodily level of toxins is now relatively inexpensive (some estimates for identifying a single gene locus are as low as $1.00 whereas a head hair test of multiple toxins often costs around $30), determining whether a child suffers from one or both of these factors in ADHD is now technologically available at very low cost. For chelating multiple toxins, there are now less expensive treatments than the traditional intravenous blood chelation with EDTA (for which costs can be as high as $3,000 to $5,000 per child). Such developments radically transform policy options as do dietary therapies like those pioneered by the Pfeiffer Treatment Center.

FOUR: A final example is provided by debates over technologies of water treatment, which have continued to ignore evidence that some chemical compounds (H_2SiF_6 or Na_2SiF_6 called "silicofluorides") enhance the uptake of lead, inhibit the enzyme acetylcholinesterase, and increase rates of behavioral dysfunctions including learning disabilities, substance abuse, and violent crime. In this case, whereas the silicofluorides were not tested for safety when first approved for use (on the "assumption" that their effects would be identical to sodium fluoride), recent epidemiological studies only show harmful side effects from silicofluorides (with no parallel effect for sodium fluoride). In this case, paradoxically, during over fifty years of bitter policy debates, both supporters and critics of the practice of water "fluoridation" have ignored the specific chemical compounds used for this purpose. Moreover, new research (unpublished as of this writing) indicates that the combination of silicofluorides with chloramines newly introduced as a replacement for chlorine in water disinfection may exacerbate this problem.

These four cases of the failure to consider how neuroscience and brain chemistry are related to technological issues in public policy can be linked to the broader resistance of social scientists to developments in the life sciences. For most political and social scientists, the identification of factors influencing human behavior have not been modified by growing biological evidence challenging traditional paradigms such as "rational choice" in economics or Marxist socio-economic models in sociology. Persisting research constrained by the traditional dichotomy between "nature" and "nurture" is no longer consistent with many scientific findings of interactive processes between biological and cultural factors. These developments, symbolized by Matthew Ridley's phrase "nature via nurture," make possible totally new approaches to understanding and in some cases regulating behavior. Paradoxically, therefore, the major obstacle to exploring a humane and effective exploration of new techniques in the domain of public policy may depend on changing the theoretical paradigms in the study of politics and social behavior.

As the new technologies in neuroscience and behavioral genetics develop further, it will become increasingly necessary to introduce new paradigms of research and to develop social science courses open to insights from biological fields including neurotoxicology. Failure to do this is likely to result in a growing tendency for a radical transformation in the structure of our universities.

Already, the "bio-anthropologists" at Harvard have indicated their desire to leave a Department of Anthropology dominated by social and cultural anthropologists who dismiss research and teaching that introduces concepts and theories from the life sciences. Lest the reintroduction of "human nature" in the social sciences seem unnecessarily reductionist, it should be added that Aristotle's philosophical writings (including such works as Parts of Animals as well as the Nichomachean Ethics and Politics) can provide a more viable theoretical framework than the currently fashionable "social construction of reality" paradigm (and the "nature-nurture" dichotomy on which it rests). Indeed, political philosophers cannot understand Aristotle's concept of teleology (or "final ends") in the Ethics or Politics without carefully considering the parallel discussion of "that for the sake of which" in Aristotle's Parts of Animals. Indeed, insofar as Aristotle's philosophy is more in keeping with contemporary biological science than is the thought of Hobbes, Locke, or Marx, reconsideration of technological aspects of public policy could merely symbolize the profound transformation of our discipline that will be needed to confront the sequencing of the human genome.

FORUM OPINION

"The Anti-Science Allegation"

Travis D. Smith
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The President's Council on Bioethics ends four years of service this fall. Among its legacies will be the reputation it earned in some circles for being anti-science. The Council has critically investigated human cloning, mood-altering drugs, embryonic stem cell research and other controversial technologies. Its reports have been often less than enthusiastic about the frontiers of medicine—not because members of the Council doubt the ability of medical science to develop technologies that work, but rather because it was not always plain to the majority of the Council's membership that it would be good if they did work. The Council has also been criticized, by a former member no less, for politicizing science.

As an activity that human beings engage in, technological science is always in some sense political. Plainly, it can increase our wealth or drain our resources, and it always affects their allocation. But more than that, it advances claims about what is the case and what should be done. It introduces changes to the ways in which we live and relate to each other. It even aims to redefine who we are.

What is meant when a position is described as anti-science? What often gets portrayed as anti-science is not so much a criticism of specific scientific models and methods or opposition to new technological products and procedures. Rather, there are ideas that adhere to the advancement of science and technological progress that are being challenged—ideas that are not, in themselves, scientific. Accompanying the activities that comprise the modern investigation into nature are assumptions, motives, hopes, and virtues—the validity or value of which scientific inquiry itself cannot discover or demonstrate. The activity of science is thus fastened to its human origins and aspirations. It is not purely a contemplative operation of the mind.

Scientists who pretend to be or insist on being independent of political entanglements wish to be above politics. Agents or advocates of technological progress who are confronted with questions about their activities find themselves engaged in political quarrels. Rhetoric is sometimes used to discredit objectors as irrational or misanthropic. First, reservations regarding the goodness of particular avenues of research and their applications are said to evidence blindness or a will to untruth. Until the minutest details of reliable and effective techniques are developed, the nobility commonly assigned to the pursuit of truth is called upon to overcome any obstacle. Additional appeals are made to the sense of wonder which leads men to pursue science, with inspiring words about the

freedom of the human spirit and the right to use our presumably-not-God-given intelligence.

Second, scientists do not plan to keep their discoveries secret. They want to share them, and not simply to earn fame and fortune, although these too are nice. Their intention is, of course, to benefit mankind. One does not need to doubt the sincerity of this motive to see that it is politically problematic. And in a liberal democracy, regardless of their expertise, nobody's desires, opinions or good intentions are authoritative. Unlike the alchemists or magicians of old, modern scientists are not satisfied to keep their findings to themselves, even if they remain arcane until their usefulness is exploited by more technologically-oriented persons. There is no knowledge that modern science pursues that is useless. If some part that has not been superseded is unused, it means only that its use has not yet been found or the means to use it have not yet been assembled. And scientists who seem to live apart from the world, abstracted away from political life, tend to make the best instruments of political and moneyed interests.

It is debatable how many technologies have unambiguously benefited mankind. Moreover, modern science on its own terms cannot give an account of what it is that makes mankind worthy of the blessings of science. Embryonic stem cell research is emblematic of this tension between means and ends. On the individual level, science on its own terms cannot tell anybody what would be good for them. It is possible for science to explain what change this or that drug might affect in the body or mind of its recipient (and what side-effects to watch out for). It can say what connecting this body to that machine should accomplish. But no researcher or medical professional can tell anyone that taking any drug or undergoing any procedure will benefit her without making all kinds of assumptions and claims about what is good for human beings that science on its own terms cannot support. Of course they do make their recommendations, which they are welcome to as political beings, but not as scientists or physicians. In those capacities, they are exceeding their expertise.

Arguments which may be construed as anti-science come from the left and the right, from secular and religious outlooks. Even those who would resist only some very small part of technological progress are accused of being anti-science, as if only unqualified support for modern science is good enough. But whether objections come from social conservatives, environmentalists or feminists, it should be understood that it is not science itself but the politics of science that is usually being contested, and such contestation is always healthy in a free society. A comparative study of anti-science views would help to isolate the ideas which defend and promote science but which are not themselves scientific, as well as detect anti-science views that in fact share the technological spirit of control and transformation often derivative of anger and anxiety. These ideas range from metaphysical speculations to expressions of material interest. The concept of "scientism," denoting the ideological devotion to modern science as if it promised salvation, encompasses some of these ideas. It must be supplemented with an articulation of the more mundane claims to rule science advances and the rhetoric it uses to silence or persuade—language that often combines incompatibles, such as inevitabilities and endless possibilities. Then the anti-science allegation may be better seen for what it is and met.

Research Summary

The Internet and Politics: The Ballot is Still Out

Stephen Frantzich, U.S. Naval Academy

Information processing is the "core technology" of politics. The three-way set of communications flows in a democracy ([1]citizen to government, [2]government official to government official, and [3] government to citizen) determines who makes decisions for the polity, the content of those decisions, and their enforcement. Each of these processes involves selective transmission of information. While face-to-face communications still occurs, much information transfer is facilitated by technology. New technologies affect the speed, content, control, and distribution of the information communicated. It is no surprise that through various waves of technological change, analysts have postulated important changes in politics emanating from changes in communications technologies. The transmission process can affect content and impact.

Previous experience with projections about impending political revolutions related to the telegraph, telephone, radio, and television should give us pause and thwart the temptation to become technological determinists. It is important to remember that technologies do not impact human institutions like two ships colliding, where unvarying laws of physics determine the consequences. Technological changes are filtered through the motivations, strategies and perceptions of human beings who can to some degree shape, direct and/or thwart consequences. There is no clear pattern as to whether new technologies will spread power more broadly, or be captured by existing power holders to use to their own benefit.

The emerging technologies (cable TV, the Internet, e-mail, I-pods, etc.) share a number of characteristics. They reduce or eliminate the impact of distance, increase the speed of communications, diminish the cost involved in broadcasting or narrowcasting a message, and increase the control the sender and/or the receiver has over message receipt. The political impact of new technologies can either emanate from their inherent characteristics that change the nature of communication or from the image one projects by being an innovator per se. Innovators tout their technological innovativeness as an indication of their forward looking approach to all political problems.

Recent experience with the Internet is revealing. Successful Internet users such as John McCain, Jesse Ventura and Howard Dean largely tapped and activated existing supporters drawn to their web sites, rather than using the technology to reach out and change people's minds. Howard Dean actually used the Internet to connect people in "old fashioned" face-to-face interaction by using Meetup.org to arrange hundreds of local gatherings where money was raised and traditional campaign strategies implemented. The Internet increased efficiency and speed of contact, but did not alter basic political approaches. A key question remains as to whether the Internet is simply an efficient replacement technology used by individuals who would have contributed or participated anyway, or whether it really taps a new stratum of political activists. While online communities can make a difference in specific situations, they tend to be much more "shallow" than traditional communities given the limitations of the technology and the ease of entry and departure (see Stephen Frantzich, *Cyberage Politics 101*, 2002).

Despite the limited number of questions related to Internet usage and politics, analyses of the public opinion polls from the 2000 and 2004 elections should serve to temper the assertions that the Internet will transform politics, at least in the short run. When one controls for the simultaneous correlates of both political involvement and Internet usage (such as educational level and income), the overall pattern on the individual level shows that Internet users are less likely to be interested and to participate in politics (based on the author's analysis of the National Election Study data). It is not clear whether this political retardation stems from what happens to people while on the web, or whether it is simply a matter of opportunity costs in

which time on the web takes away from those activities which build political interest and involvement. In 2000, only 7% of the public identified the Internet as one of their two main sources of campaign news and 24% indicated they "learned something about the campaign" from the Internet. Those figures grew to 13% as being a main source and to 33% for "learning something" in 2004 (these and subsequent specific figures based on Pew Center polls www.people-press.org) . More importantly, there was an interesting generational factor that became particularly clear in 2004. Among 18-29 year olds in 2004, 21% reported the Internet as one of their two most important sources of campaign news compared with 5% for individuals over 50 years of age. Forty-four percent of the younger age group reported "learning something about the campaign in the Internet," compared with less than 20% for voters over 50. While older web users remained politically retarded, younger generations actually revealed a positive correlation between web usage and political interest and involvement despite demographic controls.

Political revolutions have a way of sneaking up on us, but at this point the Internet is still a rumbling in the streets more than an incendiary "bomb" destined to level the playing field and change politics once and for all.

RESEARCH SUMMARY

Are Internet Technologies Enhancing Democratic Communication?
Public Participation in Regulatory Rulemaking

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In this research note, we offer a preliminary glimpse at the results of our examination of the way Internet-based submission of citizen comments has changed public participation in federal agencies' regulatory rulemaking processes. In short, our observations, based on several different types of data, suggest that Internet-based public participation has, to date, largely failed to achieve its promise of facilitating the submission of more informative and substantive comments from a broader spectrum of the public. Instead, interest groups use the Internet to organize larger electronic versions of the old "postcard" mass mailing campaign. Federal agencies, meanwhile, struggle to keep up with the increasing volume of comments rather than working constructively with interest groups and other stakeholders to produce more substantive comments.

Yet more than 70 hours of interviews, workshops, and focus groups with agency personnel over a four year period tell us that civil servants in diverse agencies do in fact want more informed comments that can help them make better rules. Our observations also lead us to conclude that, from the perspective of agency personnel, Internet-based public participation has primarily had the effect of increasing the flood of duplicative, often insubstantial, mass mailing campaigns.

Interestingly, our telephone survey of 1,553 individuals who submitted comments on three regulatory actions with contested environmental themes suggests that large numbers of submitters are genuinely interested in meaningful deliberation. Roughly 50% of respondents reported making an effort to learn about the rules on which they commented, for example by going to a federal agency website. Most surprisingly, nearly 68% claimed to have read other's comments before submitting their own comments. These responses indicate the use of information in developing a public comment is substantial.

Commenters, regardless of medium they use to submit, are information-seekers. When asked how much information they receive on rules before submitting a comment, 45.2% said they get a lot of information and a full 90% say they get a lot or some information. Over 71% of those surveyed said that they referred to the arguments, studies,

statements or positions of agencies or independent organizations before submitting a comment. Agency websites are also important sources of information for commenters; a full 50% surveyed said they used these sites in developing their comment. Again, a large majority of commenters are seeking out information, even those who submit form letters. Few of the commenters we surveyed, at least from what they report, submit comments without at least trying to better understand the issue.

A third type of data we have analyzed, the text of actual citizen comments, tells a different story. Even if some citizens are trying to engage the process in a meaningful way, the vast majority (in the cases we looked at) submit one or another variation of a form letter. Even when commenters add some unique text to the form letter, their additions almost universally lack any substantive information that is useful to agency rulemakers. Though many of our survey respondents claimed to be reading other people's comments, fewer than 1% of the comments we analyzed referenced arguments or positions made in other comments. We looked for a range of deliberative indicators: inclusion of difference, respect for a variety of positions, transformation of preferences, as well as expanding and authentic discourse. To date, very little evidence has been uncovered in the text we've analyzed that the presence of an online open docket results in greater citizen deliberation.

So, where is all this heading? In our research and writing, we paint a picture of the broader information technology and civil society landscape to answer this question. Today, the cutting edge of mass mobilization tactics seems to lie in a flourishing e-advocacy sub-sector of the economy. Our concern is that the aggregative mass e-mail campaigns may drown out the reasoned voices of those individuals who want to participate via meaningful deliberation.

Current uses of Internet technology to mobilize mass public comment campaigns have led agencies to farm out much of the work of combing through the duplicative, and near-duplicate, form letters. Agency personnel themselves report a tendency to focus on longer letters from known stakeholders. One agency staff person told us that in an attempt at "notice and comment" triage only those comments submitted on letterhead were actually read. Another said that time and resource constraints meant it was impossible to read all the comments.

The best intentions of concerned individuals and the emotive pleadings of interest groups will continue to result in floods of redundant comments; no doubt, e-mail is a boon for generating those. However, we ask readers of STEP whether they agree this practice in fact raises significant risks for the otherwise imperiled voice of public participation in regulatory rulemaking. One specific problem we see is that agency personnel are more likely to overlook the potentially influential comment e-mailed by "unimportant" but numerous e-citizens with no letterhead on which to write. Another more general challenge is the further denigration of the role of public input in the eyes of civil servants who, we find, actually crave informed and substantive dialogue in the conduct of their regulatory activities. This is true even as political appointee administrators stand at the ready to issue final rules with the facts and science "fixed" to meet a predetermined outcome. Future research will need to get at the question of whether in fact better comments and deliberation can indeed produce better rules; the jury is out.

From the agency side, the easiest way to do this, we argue, is to improve the open docket interface. Agencies could also respond to comments online during the rulemaking process, or supplement the formal comment process with online dialogues. For environmental groups, the challenge is to move from a focus on aggregative democratic methods – getting constituents to send more and more form letters – to deliberative ones. This is a tough one, as many groups are stuck in an aggregative mode that mimics their decades of work in the legislative realm. Our interviews with rule writers reveal that one single substantive comment can have a larger impact on the proposed rule than a non-substantive comment sent thousands of times.

Environmental groups might want to consider innovative ways to solicit more substantive

comments. For example, they can challenge members to think up new categories for a cost-benefit analysis. They could also prompt members to enter postal codes, and then ask them to say something about a local stream, mercury emitting industry, or community health problems. Groups could also lay out the parts of a proposed rule, and ask constituents to comment substantively on a specific section of interest.

To learn more about the work of the eRulemaking Research Group, please visit the project home page at: http://erulemaking.ucsur.pitt.edu/.

BOOK REVIEW

Winner of the 2004-2005 Don K. Price Award for Best Book in Science and Technology

Thomas Bernauer. 2003. *Genes, Trade, and Regulation: The Seeds of Conflict in Food Biotechnology*. Princeton, NJ: Princeton University Press.

Thomas Bernauer, a political scientist at the Swiss Federal Institute of Technology, has produced a thoughtful, well-written, and well-researched study of the current political state of agricultural biotechnology in both the European Union (EU) and the United States (US). True to his disciplinary home, Bernaur's primary emphasis is upon the complex public policy matrix surrounding genetically modified foods (GMFs) on both continents, more than the existing and potential technological developments in this multifaceted field of scientific and technological change. His special interests focus on problems he sees in the diverging regulatory frameworks emerging in the EU and in the US, and the impacts of what he refers to as "regulatory polarization" on the future domestic commercialization of GMFs, along with growing international trade instabilities. It's a full plate of political, institutional, cultural, and economic issues, and Bernauer argues that the stakes are, indeed, high and solutions elusive. In a larger frame, Bernauer explores the impacts of different—and diverging—national strategies for balancing the potential costs and benefits of this array of technologies.

Bernauer's analysis of why EU and US approaches to regulating GMFs are diverging—with the EU shifting toward greater stringency while the US maintains greater regulatory laxity—emphasizes structural, institutional, and political factors. The EU's decision-making structure in regulatory matters is significantly more decentralized than in the US, with individual member countries in the EU capable of imposing stricter standards than the EU requires, while individual states in the US face more limitations in creating state standards that vary from those established by federal authorities. When public perceptions and attitudes are factored in, we see the federal authorities in the EU gradually acceding to the demands of member countries, and a general "ratcheting up" of EU standards. On the other hand, given low levels of public knowledge or concern about GMFs in the US, coupled with wider and more pervasive federal preemption in regulatory matters, in the US we see stable, and more lax, regulatory impositions.

Moreover, given how these trends are rooted in larger structural and institutional forces, Bernauer sees little likelihood that either trend will change, leading to what he sees as a pernicious regulatory polarization. The two largest economies in the world, and the leaders in developing GMFs technologies, are headed toward greater and deeper conflicts, unless they find ways of mediating their differences.

As other countries—in Africa, Asia, Latin America—enter the GMF era in their own domestic economies, Bernauer notes how the EU and the US complete to influence the kinds of regulatory schemes those countries develop, whether in the more risk-tolerant American or risk-averse European mold. Typically, he notes, countries in the immediate US or EU orbits tend to follow the lead of their larger, stronger neighbor, while others pursue policies that fall somewhere between the two.

Bernauer worries that this *status quo* will permanently harm the development of international standards for trading GMF products. Potential investors will shy away in the face of unpredictability, potential consumers—GMF farmers, middle markets, etc.—will be unable to plan or invest because of global instabilities. As a result, the potential benefits of agricultural biotechnology will be lost, as well as the possibilities for detecting and correcting the inevitable negative impacts of the technologies, whether health-related, environmental, or economic and political.

He speculates upon the prospects for the current levels of trade conflict escalating into full trade wars over GMFs, including the possibility of WTO sanctions. Will more countries gradually endorse EU-style regulatory stringencies, or the more market-oriented US laxity? If there is a shift toward the EU, will the US accede, increasing its own standards to match the emerging global consensus? Will the US try to force open the markets closed to it because of regulatory differences? None of these options is desirable, Bernauer says, and he proposes a set of policy responses that he hopes might resolve the differences without the chaos of a trade war.

He recommends greater regulatory centralization (more on the US than the EU model), coupled with enhanced liability laws, as a start. Independent, powerful, and scientifically-oriented regulatory agencies would help to overcome the upward ratcheting effects of the EU's decentralized decision making processes, and, he hopes, enhance the public's willingness to trust that effective monitoring for risks is in place.

Secondly, both public and private stakeholders should support the establishment of local and global markets in both genetically modified and unmodified foods, so that consumers can clearly differentiate between GMFs and non-GMF products. This may entail public subsidies in the early stages of creating effective segregation and labeling standards and practices. It will also move GMF developers toward the introduction of new GMF products with clear consumer benefits, rather than only producer benefits, as has been the case in the first generation of GMFs.

Third, international efforts and funding should be directed at creating effective regulatory systems in developing countries, to overcome their weaknesses and bolster their own populations' acceptance of GMFs in their food steams.

These steps, Bernauer argues, will move both the developed and developing world beyond the crisis of existing regulatory polarization, and move the world toward a global system of regulation, monitoring, and development for these technologies.

Bernauer's analysis, especially of the political, structural, and institutional sources of the existing tensions between US and EU approaches to managing these technologies, is insightful and informative. He points to the various sources of the diverging approaches with clarity and his explanation of why those approaches are unlikely to find a *modus vivendi* is convincing. This creates some problems—which he recognizes—for the acceptance and implementation of the compromises he suggests. Still, his discussion of the longer-term costs of pursuing a more confrontational approach may lead policy makers to seek more accommodating avenues.

For myself, I would like to have seen more attention to public acceptance issues than Bernauer provides. In this area, I would have liked to see discussion of techniques that might allow for greater public involvement in the shaping of regulatory policies, rather than relying on largely ineffective "public information" programs. There are techniques available, such as the Danish consensus conference practice, through which *informed, deliberative public input* can be generated, which might go some distance to overcome public distrust of both corporate powers and governmental overseers. Not only would such public deliberations provide both public and private decision makers with valuable information about what worries the public *after they've studied the issue*, making such deliberations widely available—through the Internet, for instance—would give other citizens access to the thinking of ordinary people

like themselves, and provide them with *considered, deliberative opinions* instead of advocacy manipulations. Bringing ordinary people deeper into the process, rather than keeping them at arm's length, would enhance legitimacy and reduce conflict and opposition, which all sides in these disputes should welcome.

Reviewed by Patrick W. Hamlett, Science, Technology & Society Program, North Carolina State University

BOOK REVIEW

Winner of the 2004-2005 Lynton Keith Caldwell Prize for Best Book in Environmental Policy and Politics.

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

(Editor's note: We also reviewed this book in Spring 2004—we wanted to make sure Barry had two opinions to mull over!)

According to scientists who study the issue, global climate change is the most serious environmental problem facing the world in the 21st century. In response to highly publicized scientific concern, 147 nations have ratified the Kyoto Protocol, which requires its industrialized signatories to institute measures that limit their emissions of greenhouse gases. The United States, however, is a prominent exception. President George W. Bush insists that more research is needed before taking action to address climate change and assures the public that, in the meantime, his voluntary program will suffice. Congress has been equally intransigent: after refusing to consider the issue at all for nearly a decade, since 2003 the Senate has twice rejected measures aimed at curbing U.S. emissions of carbon dioxide, the most prevalent greenhouse gas. In short, if one looked only at national politics, one would be forced to conclude that the U.S. is curiously unconcerned about climate change and impervious to the warnings of the scientific community. Barry Rabe's *Statehouse and Greenhouse* belies such pessimism, however. As Rabe explains, although opponents of climate change policies have maintained a stranglehold on the federal decision-making apparatus, the states have been enacting policies that, directly or indirectly, aim to reduce their contribution to global warming.

Rabe categorizes and describes the variety of approaches that states have embraced. Some, like Texas (and more recently Colorado), have instituted requirements that utilities generate a percentage of their power using renewable energy sources. Rabe calls such mandates "stealth" policies because they are not explicitly (or even implicitly) designed to address climate change. By contrast, "opportunistic" states like Illinois and Nebraska have adopted policies that hope to capitalize on an emerging market for carbon credits by encouraging agricultural soil conservation. (Conventional plowing and other farming practices release the carbon that is naturally stored in agricultural soil, whereas conservation tillage retains carbon.) The most progressive states, including California, Massachusetts, New Hampshire, and New Jersey, have adopted programs specifically aimed at reducing greenhouse gas emissions. California's 2002 legislation, for example, required the California Air Resources Board to develop regulations that would achieve "the maximum feasible and cost-effective reduction" of greenhouse gases from cars, SUVs, and light-duty trucks. Nine northeastern states are working with five eastern Canadian provinces to develop a regional cap-and-trade system for carbon dioxide that is supposed to be in place by late 2005.

Although they are unlikely to make a serious dent in the emissions reductions needed to stem global warming, these state-level policies are nevertheless important for several reasons. First, they contribute to a sense of political momentum—

a feeling that climate change regulation is inevitable—and hence increase the likelihood of federal mandates. In addition, the hodge podge of state-level regulations is costly and annoying for companies that do business in multiple states and so creates an incentive for them to lobby for uniform federal regulations. Finally, as is often noted, states are "laboratories of democracy"—that is, places where experiments in policy design can reveal the strengths and weaknesses of different approaches.

Among the book's most interesting scholarly contributions is Rabe's discussion of how state-level policy entrepreneurs have crafted policies that fit the economic and political realities of particular states. They have done so, Rabe contends, without the kinds of visible, contentious, partisan brawls that have been occurring at the national level. In many states, he explains, agency officials charged with studying climate change evolved into policy entrepreneurs who were "well positioned to see opportunities for new policy and to literally translate ideas for innovation into workable policies" (23). These entrepreneurs, who are skilled at building coalitions within and outside of their own agencies, operate behind the scenes and get little public recognition for their activities. According to Rabe, they have succeeded by taking advantage of three aspects of state politics. First, the federal government's inertia has created some "policy room" in which states can act. Second, state-level policymakers are beset by fewer interest-group and partisan squabbles; hence there is more opportunity to establish lasting networks. And third, some states have begun to perceive it is in their economic self-interest to enact environmental policies.

Notwithstanding its thoughtful observations about the role of policy entrepreneurs, *Statehouse and Greenhouse* does not offer a formal theory of state-level political action; nor does it purport to test an existing model. Instead, it aspires to the useful goal of categorizing and describing the different types of policies states have adopted and the process by which they came to do so. In that it succeeds admirably. Equally important, *Statehouse and Greenhouse* is written in clear and lively prose, so someone other than graduate students studying for general exams might actually read it. Perhaps it might even interest some of those self-effacing but highly effective state-level bureaucrats, who will be quietly pleased at the recognition.

Reviewed by Judith Layzer, Massachusetts Institute of Technology, Member, Lynton Keith Caldwell Award Committee.

BOOK REVIEW

Nelly Oudshorn. 2003. *The Male Pill: A Biography of a Technology in the Making*. Durham, NC: Duke University Press.

Nelly Oudshorn's *The Male Pill* is one of the best books in science and technology policy to appear in the last two or three years. It addresses a crucial problem that is simply a taken-for-granted condition for billions of sexually active people worldwide: chemical contraception is available for women, but not for men. Oudshorn frames her study in social constructionist terms, but its heart is empirical legwork, carried out in diverse organizational and cultural settings. This rare blend of problem, theory, and research is rendered accessible by straightforward prose and a clear organizational structure.

If researchers can figure out how to create and deploy a male pill that is safe, effective, and economical, they will have done a great public service. Women have borne the brunt of contraception, and that simply isn't fair. For many, it isn't safe or practical, either. Many men would benefit from the choice and control provided by chemical contraception as well. This "technology in the making," as Oudshorn calls it, could play a valuable role in population control. But it is a vision not yet realized, as best I can tell, two years after the publication of this book; although more clinical trials are underway than in the past, no male pill is yet on the market.

I accept the fundamental insight of social constructionism, but find that much of what is written under that label obscures more than it clarifies about the process by which social interests shape science and technology. That is not the case here. Oudshorn shows how gender bias and institutional habit entered into R&D decision-making in both the public and private sectors over a period of decades. More important, she shows how users of this technology mattered to the innovation process. Expectations about users and their actual behavior, when compounds were actually put into testing, profoundly influenced the projects on which researchers have wanted to work and in which governments and firms have been willing to invest. In order for science and technology to move forward in this area, men had to be brought effectively into the contraceptive discourse and the institutions through which the technology was deployed had to be redesigned.

One of the most original examples of these processes appears in the chapter that Oudshorn devotes to the reconfiguration of family planning clinics to accommodate male clients. Using case studies of clinics in the U.S. and Colombia, she shows not merely that budgets and staff had to be reallocated in order to effectively serve both genders, but that the physical space of the clinics themselves and the range of other services that they offer had to be altered as well. For one thing, men seem to need to receive services other than contraception to provide "cover" if they are to use these clinics; such services had not typically been offered to women. Given tight budgets and the feminist traditions of these important institutions, the conflict that accompanies efforts to "make room for men" in them is not surprising.

That the "male pill" has moved as far as it has is the result of committed scientists, dogged activists, and effective international civil servants. The World Health Organization, spurred on initially by the governments of India and China, lies at the core of the "alternative sociotechnical network" described by Oudshorn. More recently, private firms – not as brave but nonetheless commendably courageous – have entered into it. This portion of the narrative is a vivid reminder of the tragic underinvestment in global public goods, especially science and technology, and of the central importance of international institutions in creating them.

My fulsome praise for this book ought not to obscure an important unanswered, and perhaps unanswerable, question about the "male pill" that goes to the heart of Oudshorn's thesis and her theoretical framework. It may indeed be intrinsically more difficult to create safe and effective chemical contraceptives for men than for women. To put it too simply, sperm and eggs are different. Social constructionism, as ably deployed in this book, helps to explain the gross imbalance in the effort that has been devoted to male and female contraception and to some degree differences in the productivity of these two research thrusts as well. Yet, nature remains out there as a trump card for all of science and technology, participating with society in constructing what we know and what we can do.

Reviewed by David M. Hart, School of Public Policy, George Mason University

BOOK REVIEW

Vincent Mosco. 2004. *The Digital Sublime: Myth, Power, and Cyberspace*. Cambridge, MA: The MIT Press.

In the realm of science and technology, the central tenants are facts, reason, and rationality. These are generally opposed to emotions, beliefs, opinions, and folk-tales. But as Thomas Kuhn has shown us, all is not what we think. The reasoned objectivity of science and technology is inseparable from the emotions and beliefs of society and social norms. Cyberspace by its definition is unreality; but, its applications and future evaluations are argued to depend on reasoned objectivity.

Otherwise, why invest hundreds of billion of dollars on simple folk-tales?

Vincent Mosco, Canada Research Chair in Communication and Society at Queens University, specifically looks at the world of cyberspace through the analytical tools developed predominantly in sociology to study myths and the value of myths. Specifically, he looks at the myths that are generated about the new technology called the "computer age" or the "information age."

This is the essence of Mosco's first chapter, to look at how the idea of myth and mythology helps us understand how we view the world. He argues that the anthropological idea of myth as an ordering of human life is an approach with significant value to understanding our age.

He follows this by looking specifically at myths and how cyberspace has resulted in particular myth being constructed as part of our everyday life. Myths are a way for human beings to organize the world around them either to reconcile beliefs that are in dissonance or as a way to project an optimistic acceptable future. The three major myths of the post-modern world are the end of history, geography, and politics. The predominant myth of our time is the end of history according to Mosco. The other two myths play a significant role in contemporary cyberspace mythology; nonetheless they are less unique to our historical epoch.

In each of the next two chapters, Mosco deals directly with these myths. Chapter Three is devoted to the end of history, and the end of geography and politics are the themes of the Chapter Four. The end of history idea was originally posited for the post industrial world by Francis Fukuyama. It argues that there are no longer the ideological divisions that characterized earlier times. Solutions to problems are now longer ideological but rather technical, solved by professionals. It is that kind of cooperation that cyberspace affords while simultaneously promoting a level of cooperation and understanding impossible for earlier generations.

The end of geography and the end of politics are both reflected in the myth that place does not matter since we are all interconnected. This interconnection makes distance and time irrelevant in ways that were never possible whether one considers work or play. Because cyberspace has such an equal opportunity access, the traditional power monopoly of some groups rather than others is diminished. As a result, the political pursuit of power is either leveled among groups or made irrelevant because everyone has access to equal opportunity in cyberspace.

Some of these ideas and concepts about cyberspace are not new, in large part because we have heard them constantly about the new post-modern world. Cyberspace and the Internet will make the world accessible to all people equally at a relatively low price. In Chapter Five, the book looks at various 19th and 20th Century technological developments: electricity, telegraph, telephone, radio, and television, to show that they all acquired the same myths as today's cyberspace and all ultimately failed to reach the mythological expectations. Although they all had consequence in developing human society, the development usually came after the mythological hype and usually was much less successful than the myth predicted. The myths have usually been the same: greater democracy, improved education, end to scarcity, and improved work and leisure. None of these came to fruition and Mosco argues that they will not for the Internet and cyberspace.

In the final chapter, Mosco argues for the ultimate intrusion of history, geography, and politics on our cyber world with the events of 9/11. In some ways this is the most confusing chapter because he seems to want to avoid fact and continue with a mythology of no evil people and cultures committed 9/11. Although many of the issues that Mosco introduces to explain the optimism of computers, Internet, and cyberspace through mythology, the final chapter does show some of its problems.

First is William James' insurmountable problem in his *The Will to Believe* as an explanation for religious commitment. Human beings who have a religious commitment do not "will" to believe – they believe, period. Second, in the same sense, social and cultural myths are only myths from the

outside, they are not myths to those in the society – they are reality. Third, if one is to accept the universality of myth than there is no distinguishing between truth and falsehood. But Mosco himself insists on arguing that it is possible to tell the difference between true myths and non myths – otherwise why write the book to argue the case.

Even with the general problem of using myths to understand cultural phenomena, this is a richly rewarding book to read on how technology and society continue to repeat the same optimistic "dance of expectations" with each new breakthrough. I believe that this kind of critical non-Luddite look at cyberspace is essential and Mosco does a good job at it. It is well worth the reflection on ourselves that he presents.

Reviewed by Maurice M. Eisenstein, Purdue University Calumet

BOOK REVIEW

Robert Duffy, 2003. *Green Agenda in American Politics: New Strategies for the 21st Century.* Lawrence, KS: University of Kansas Press.

In *The Green Agenda in American Politics: New Strategies for the 21st Century*, Robert J. Duffy provides a detailed, yet highly readable "discussion of emerging trends in the ways in which American environmental groups approach electoral politics, and in the strategies they use to affect government decisions (5)." He documents and explains recent changes in the political behavior of environmental groups especially their more aggressive participation in elections at all levels and the use of new communications technologies to educate and mobilize their grass roots and to influence policymakers. This book is a must read for students of environmental politics. It should also appeal to a wider audience interested in contemporary interest group behavior, particularly the struggle of interest groups to define issues and set the political agenda through indirect and outsider lobbying strategies. Students of elections will find the author's discussion of environmental groups' participation in campaigns and maneuvering within campaign finance strictures stimulating and thought-provoking.

Duffy argues that the Republican takeover of Congress in 1994, the shift of policy responsibility to the states, and the successful grassroots organization of wise use and property rights groups in the congressional elections of 1992 and 1994 caused environmental groups to reassess their lobbying strategies. He documents how environmental organizations, with substantial financial and strategic support from foundations, have engaged in significant capacity building at the grassroots level over the past decade. While Duffy does not fully accept the heavy criticism leveled by some at national environmental groups for their Washington focus, pursuit of a direct and "insider" lobbying strategy, and use of litigation, he does agree that by the 1990s environmental interest groups definitely needed to pay more attention to grassroots organizing, to revise their lobbying strategies to include a greater emphasis on indirect and outsider lobbying, and to expand their lobbying targets.

Duffy provides a thorough description of the shape of contemporary environmental lobbying campaigns. He amply illustrates how they have become more sophisticated at identifying audiences, selecting and refining their messages and making extensive use of technology to communicate with members, the public, the media and other target audiences. These campaigns frequently involve coordinated efforts among multiple environmental groups at various levels as well as coalitions with other interest groups.

The author does a particularly excellent job of discussing the participation of major environmental groups in elections and the development and short-term effectiveness of their electoral strategies. He presents data showing that environmental PACs are raising and spending more money in elections with much of this money going

for independent expenditures, issue advocacy and voter education rather than direct contributions to candidates. Yet, the author is cautious about the long-term political and policy impact of environmental groups' efforts at issue definition and agenda setting and efforts to get voters to consider candidates' environmental records. Environmental interest groups are not the only ones attempting to develop and market their ideas using sophisticated marketing techniques and modern communications technologies and to engage in "all-directional" lobbying. Despite raising and spending record amounts of money in recent election cycles, environmental groups have to compete with other, better-financed interests also seeking to define the agenda and mobilize supportive voters. Nonetheless, Duffy recommends that environmental groups continue to build and expand their efforts to identify, educate and mobilize voters, to communicate with members and the public on an ongoing basis, rather than just at election time, and to recognize the opportunity in races typified by low turnout. He also recommends that environmental groups continue to train political organizers and place them in campaigns and to dedicate significant resources to campaigns for local offices, which are responsible for many important environmental policy decisions and are training grounds for candidates for higher offices. Although Duffy notes that the strategy involves substantial risk, he endorses the strategy of focusing on a limited number of carefully selected electoral contests – generally close races in which the mobilization of environmental voters may be a key factor.

Duffy does a good, yet succinct job of discussing some of the disturbing implications of the acceleration in interest groups' vying for the public's attention, such as candidates losing control of their campaigns, the "nationalization" of House campaigns, voter confusion and the difficulty of achieving accountability in elections and public policy debates, and the fairness of a system in which individuals and groups can spend unlimited amounts in independent expenditure and issues advocacy campaigns.

Early on in the book Duffy mentions the debate over whether it is better for environmentalists to form a stronger alliance with the Democratic Party which runs the risk of having to compromise environmental goals or to support candidates with strong environmental positions regardless of party. Also discussed early on are the importance of political culture and the importance of language and stories in shaping the political agenda. Unfortunately, the author does not return to these points. Even though we shouldn't expect Duffy's book to resolve the above-mentioned debate, or necessarily leave us with a clear sense of whether environmental groups will be able to use their new political strategies and enhanced political skills to develop stories sufficiently powerful to give environmental issues greater, and more widespread and enduring salience in American politics, we might expect him to remind the reader of the continuing importance of these issues.

Reviewed by Janet B. Johnson, University of Delaware

BOOK REVIEW

Elizabeth Economy, 2005. *The River Runs Black: The Environmental Challenge to China's Future*. Ithaca, NY, Cornell University Press.

China's environment is a topic of increasing importance. In both Asian and Western media one sees on an almost daily basis articles about China's growing appetite for coal and oil, large-scale pollution riots, water shortages, factories and infrastructure projects in gross violation of environmental law, and many other equally worrisome topics. It is hard not to get the sense that China faces—if it is not already in the midst of—a looming environmental crisis. Nor are China's environmental problems limited solely to those living on the Mainland. Some report that as much

as 30 percent of the mercury in the United States' soil and groundwater comes from other countries with the brunt coming from China who, as world's largest source of non-natural mercury, accounts for about a quarter of global emissions.[1]

It is for this reason that Elizabeth Economy's book, *The River Runs Black: The Environmental Challenge to China's Future*, is a timely contribution to a growing literature on China's environmental politics. Economy, a Council on Foreign Relations scholar who has over a decade experience and is one of the foremost experts on China's environmental politics, brings her considerable knowledge to bear in this wide-ranging volume. Few scholars of China's environmental politics could write a book that touches on so many topics. In order of chapters, the books examines: the history of China's environmental exploitation from the Tang dynasty through the Mao era (2), the repercussions of China's phenomenal growth on the environment (3), the development of China's environmental protection regime (4), the rise and potential impact of China's environmental activists (5), and the influence of the international community on China's environmental politics and protection (6). The penultimate chapter (7) offers a comparison of China's environmental politics with other countries both in East Europe and Asia-Pacific before the final chapter offers three exceedingly brief scenarios for China's future. Given the breadth of topics, the volume is well suited for anyone interested in an introduction to China's environment and is a must for a course on Chinese domestic politics and policymakers dealing with international environmental issues.

As Economy tackles each chapter's topic, she offers some dramatic facts that provide keen insight into the scope of the challenge China faces. For instance, she tells us that in China approximately sixty million people find it difficult to get water sufficient for their daily needs and more than ten times as many have drinking water tainted with animal and human waste (68). In the 1990s 20-30 million people (more than the entire population of New York) were displaced by environmental degradation and another 30-40 million might be displaced by 2025 (82). Several of her examples also show the dreadful inadequacy of China's environmental protection system. For example, according to Economy there are three environmental lawyers in the Shanghai environmental protection bureau. In New York State, which has only a few million more people than Shanghai, there are 135 environmental lawyers working in government (113). Also, the State Environmental Protection Administration (SEPA) was not among the 22 government agencies charged with leading the development of China's impoverished Western region in the "Go West" campaign (211). This fact is stunning given that much of the development plan is based on the exploitation of the west's natural resources.

Though a four-sentence synopsis can hardly do a book of this breadth justice, Economy's argument can be summed as follows. In the last twenty years, China has achieved phenomenal growth but at a tremendous cost to its environment. Environmental degradation has reached such a degree that it not only directly affects millions of lives, but also threatens future growth and possibly political stability. China's leaders recognize the urgency of the situation, but have dealt with the problem in the same way they have promoted economic growth—devolution of authority to the local level, mass campaigns, reliance on foreign capital, and wary acceptance of a growing NGO community. This approach, while successful in economic development, is less suited to the task of environmental protection and thus China is not addressing adequately its environment challenge. Setting aside the last chapter, which somewhat disappointingly fails to give a clear sense of Economy's conclusions, the book's argument is as compelling as it is troubling. China faces a looming environmental crisis, but is either unable or unwilling to do what is necessary to avoid its consequences.

[1] Pottinger, Matt, Steve Stecklow and John J. Fialka, 2004, "China's energy appetite poses a pollution threat with world-wide scope", *Asian Wall Street Journal*, 17 December

While the volume serves as a useful introduction to Chinese environmental politics, those already familiar with the topic will find Economy's work less rewarding. What the book gains in breadth, it sacrifices in depth. Economy's research is almost entirely based on English-language secondary sources and, as such, those who follow Chinese environmental politics on a regular basis will find little new material or analysis. It feels less like original research than a well-crafted summary of what we have been reading in the paper for the last several years. There are many instances in which Economy could have made use of a burgeoning Chinese-language literature on the environment and enriched her analysis. For instance, on the topic of WTO and the environment (covered in chapter 6), the *China Environmental Science Press* has published a six-part series covering several aspects of how WTO entrance will impact China's environment. It provides a detailed exploration of various issues such as the effect of WTO on domestic policies, environmental technology and services, multilateral environmental agreements, eco-labeling, etc.

Economy's seeming desire to touch on every relevant aspect of China's environmental politics, along with her reliance on a patchwork of Western sources, undercuts her work in other ways. At times, the discussion is so brief one wonders if it is worth including (e.g. a one-paragraph discussion of the influence of Buddhism on China's environmental culture on page 36). Other times topics seem out of place, or at least tangential. One example is the description of the Three Gorges Dam project in the chapter 6. In a chapter dedicated to foreign influences on environmental politics, Economy only briefly touches on the international aspects of the dam and dedicates more than half the section to re-hashing well-known problems with the dam including corruption, resettlement, and feasibility.

Perhaps most disappointing is chapter 5, in which she profiles various environmental activists that she claims have had a "profound impact on the evolution of China's environmental movement" (138). She gives significant attention to these activists' recalcitrant political views, noting that several of them think the best way to protect China's environment is to democratize the political system. She talks of campaigns that "not only have energized the environmental activists but also helped catalyze a nationwide environmental movement" (149). Set aside for the moment whether it is accurate to say China even has an environmental movement, which Economy never defines or discusses, but simply assumes. With a couple exceptions, Economy provides relatively little insight as to exactly how or to what extent these individuals and campaigns have influenced outcomes and/or other key actors (e.g. government officials, media, general public). The chapter basically reads as a series of biographies. We can conclude that there are several individuals who care a great deal about China's environment and that they know one another well, but the larger implications are murky especially as later in the chapter Economy backs away from her talk of an impending environmental movement and emphasizes the considerable constraints on environmental activism in China.

To a certain extent, criticizing Economy for a lack of depth or a failure to strengthen her argument by making use of Chinese sources is academic quibbling. Any one of her chapters could be a monograph-length study and in fact some are (e.g. Mark Elvin's *Retreat of the Elephants* or Judith Shapiro's *Mao's War on Nature*). If one wants to cover as many topics as Economy tackles in this volume, depth inevitably has to be forfeited. Critiques aside, Economy's work is a worthy addition that contributes to our knowledge about the vital subject of China's environmental challenge.

Reviewed by Phillip Stalley, George Washington University

BOOK REVIEW

William Lowry, 2003. *Dam Politics: Restoring America's Rivers*. Washington DC: Georgetown University Press.

William Lowry, professor of political science at Washington University in St. Louis, has written an excellent study, through a series of case studies, of Dam management in the United States. He has also developed a useful typology for understanding conditions in which we might anticipate changes in the management of dams (including their removal).

Dam Politics consists of eight chapters. Chapter one is essentially an introduction and outline of the book. Chapter two presents the theoretical framework used to develop his typology of anticipated policy changes (discussed below). Chapter three examines how our use, management and thinking about rivers have changed over time; this chapter also summarizes the major players (institutional and otherwise) and policies that govern river management. Chapters 4 through 7 each provide two case studies (one more detailed than the other). The rivers examined are the Neuse River in North Carolina and the Kennebec River in Maine (chapter 4); the Colorado and the Mississippi Rivers (chapter 5); the Elwha River in Washington and the Osage River in Missouri (chapter 6); and the Missouri and Snake Rivers (chapter 7). The final chapter provides a synopsis of how the typology developed applies to the cases and explores the application of the typology to other policy environments.

As Lowry lays out the theoretical basis for developing his typology (primarily using implementation literature, the advocacy coalition framework literature and common pool resource theory) one is struck by how simple (or seemingly obvious) so much of the policy formation theory really is. While this section is well written (and necessary) one comes away feeling that we really don't know all that much about how and why policies come into being and that what we do know (and can agree on) is sometimes trite. (For example, as Lowry notes, "One of the oldest lessons of the public policy literature is that 'some social problems are much easier to deal with than others,' " (p. 18). For general policy scholars the strength of the work is in the synthesis of these theories into a typology that is useful for examining policy shifts in any policy arena. Basically the "Theoretical Framework for Policy Changes" consists of a four cell matrix with political receptivity to changes (these include political and social conditions) running along one side (from high to low) and the physical complexity of changes (by which he means the actually physical characteristics of a river, geology and typography, as well as stakeholders and jurisdictional overlap) along the other (high to low). A river with high levels of political receptivity to change and low physical complexity (such as, he argues, the Neuse and Kennebec Rivers) has a high chance of experiencing fundamental changes (both these dams were removed). In contrast a river with low levels of political receptivity to change and high physical complexity (such as, he argues, the Missouri and Snake Rivers) is more likely to experience disjointed (or incremental or minor) change.

Although the focus of this short review is devoted to the typology Lowry develops, the bulk of the book (and the primary value, I suspect most readers will derive from the work) is in the case studies. Lowry has conducted extensive interviews with hundreds of people in writing the case studies. They are readable, well written and — if you like water and natural resources management — a pleasure to read.

Reviewed by Zachary A. Smith, Northern Arizona University

BOOK REVIEW

Sheila Jasanoff and Marybeth Long Martello, (eds.), 2004. *Earthly Politics: Local and Global in Environmental Governance*. Cambridge: MIT Press.

Jasanoff and Martello and their collaborators set out to examine the intersection of local and global dimensions of environmental problems and their solutions. Their elegantly written and provocative study begins with the observation that environmental politics "has historically been a politics of the local. It derives emotional force from people's attachment to particular places, landscapes, and livelihoods, and to an ethic of communal living that can sustain stable, long-term regimes for the protection of shared resources" (7). This observation triggers a set of interesting questions, such as, given its roots in local, well-known place-based concerns such as NIMBYISM (not in my back yard) and a land-based ethic of caring for the environment, how has environmentalism become a global phenomenon? How is this sense of the local integrated into global environmental governance, and, in turn, how is it that the implementation of the global environmental protection agenda has led to a "rediscovery of the local?" How can global actors access local knowledge and motivate local efforts? And, fundamentally, what is meant by terms such as "global" and "local" and what are different ways of theorizing about the global and the local in environmental politics?

In contrast to pursuing a standard political science analysis of the intersection of global and local perspectives in understanding environmental issues, the authors focus on the production and use of knowledge and how knowledge is a resource that is mobilized for political purposes. Knowledge-making and social ordering, they argue, proceed together and are highly interactive, as governing institutions create knowledge and then apply it to policy problems. This raises questions such as, how do terms like global and local relate to different ways of knowing and assessing environmental problems? How do differences in the production and use of knowledge shape the political struggles surrounding those problems? What global environmental regimes have made room for local knowledge and politics? How has the shift from science to knowledge affected global environmental challenges? How adequate is scientific knowledge and how does it supplement science? How has local knowledge helped broaden the definition of expert to include nonscientists? And what are the comparative strengths and weaknesses of traditional science and locally-rooted ways of knowing?

Clark Miller's chapter on the International Research Institute for Climate Prediction and the role of institutions in holding Western science accountable to people in developing countries provides a useful example of the differences between conventional political science and inquiries rooted in science and technology studies. He discusses a recent study of empire and imperialism that focuses on traditional political institutions, and argues that a much better way to study the fundamental character of empire is by examining how institutions classify, standardize, and order knowledge and people. These scientific, social, political institutions link people together in fundamental ways that produce core identities and values. To understand the foundations of global power, we should look not to the UN General Assembly or Security Council, for example, but to the public and private institutions that produce scientific and technical information (81).

The other chapters in *Earthly Politics* examine a wonderful, rich array of topics, including environmental knowledge at the World Bank, safety of biotechnology, social movements in Thailand, whaling in the Pacific Northwest among the Makah, the U.S. chemical industry, European environmental cooperation, bioprospecting, urban ecology in Berlin, and a number of chapters on climate change, including the intersection of global and local in the Kyoto Protocol and climate change policy in Brazil and Germany. The editors nicely integrate chapters into the entire book through introductory and

concluding essays, and by the authors relying on a common conceptual framework reflected in the questions above surrounding the intersection of local and global and the production and use of knowledge.

Not only do the editors and authors examine an extraordinarily ambitious set of questions that seek to illuminate the dynamics of global and local environmental politics and policy making, but they seek prescriptions for constructing effective institutions that can effectively address problems that reach beyond national boundaries. How will these global efforts intersect with local ones, they ask? How will knowledge be constructed and produced, and how will it intersect with political power? What are the different ways processes of localizing and globalizing affect the creation of laws and institutions, politics, access to scientific forums? What kinds of accommodations between global and local are "most likely to lead to political impasse and injustice" and which will lead to balanced, knowledge-enhancing relations? (25) What kinds of procedural innovations in science, politics, and governance are needed? What kinds of more flexible, just, effective approaches to global governance can we imagine?

Earthly Politics offers lots of good news in answering these questions. Heightened awareness of the challenges facing the world such as global climate change, has, paradoxically, resulted in a renewed interest in and commitment to local ways of knowing and solving problems, as evidenced by the integration of local and indigenous knowledge, in particular, into global environmental regimes. Recognition is growing that both the global and the local play essential roles in effective governance. Knowledge is coming to be defined and understood much more broadly than simply science, and global regimes are incorporating a much more diverse range of knowledge. One of the key developments is the recognition that the relationship between science and policy is not linear—more scientific knowledge does not lead to more rational or quicker or more certain policy making, the same scientific knowledge has led to divergent policy responses from different governments, and science has not been able to silence controversy.

The two-fold development of the discovery of the limitation of science and of the importance of the social processes by which knowledge is produced has supported the idea of bringing local perspectives "back into processes of environmental governance" (338) and the need for expanding the range of sources of knowledge brought to bear in global environmental governance. Science is essential but limited, particularly when used to diagnose problems, and must be supplemented with local knowledge. Scientific reductionism is balanced by holistic local knowledge, and a holistic framework is particularly critical for remedying environmental problems. As local knowledge is valued, it contributes to support for more ambitious policy efforts. Conversely, global efforts can also encourage broader, more democratic participation.

The editors conclude that global environmental institutions do not simply implement policies for global issues but sort out what is global and local, and encourage global cooperative as well as local solutions. Globalization is not an inevitable force but is constructed and localization can occur in the face of globalizing pressures. Their major recommendations center on the importance of global institutions recognizing that designations of global and local are not natural or objective or scientific but are created by those organizations themselves and by others. Self-reflection is essential for those organizations, to be encouraged by transparency, submitting themselves to external critics for evaluation and review, and regular reflection on "why" questions, rather than "how to inquiries" (344). Other prescriptions include recognizing that claims of expertise are "valid only within particular 'situated' frameworks" and should be subject to criticism, particularly those from "long-term, highly routinized, standard setting bodies" that tend toward the insular (345), encouraging critical assessment of new analytic techniques such as environmental economics by lay and expert audiences, and provided forums for scientific communities to assess lay knowledge and reverse the typical flow of epistemic power. Science

is itself a form of localism and scientific and expert bodies need to learn to identify their "blind spots" and "constraints of imagination" (348). There is little discussion of exactly how institutions do this. But the design of institutions is not the real target; rather, the "ideology of global governance" by bringing together theory and practice and empirical studies that are built on deep conceptual analysis.

Jasanoff and Martello and their co-authors have crafted a very hopeful book, that environmentalism is contributing to a more accountable, democratic global order that includes local voices and epistemologies and fosters broad participation and diversity. I think, however, that their optimism must be balanced by the fear that the local may be becoming more prominent by default, as support for stronger global efforts is not materializing. Global environmental threats are daunting and precautionary, conserving action is compelling, but there is still little support for the kind of effective global governance required to force changes in the large scale industrial, commercial, energy production operations that generate so much of the global threat. If effective global action at the scale required to really reduce risks, such as the 60-80 percent reduction in greenhouse gases many scientists are convinced is required to ensure a stable climate, is to occur, or the kinds of broad measures required to protect biodiversity and the last remaining wild lands, there will need to be quantum leap in global environmental governance that go well beyond the kind of earthly politics this book describes.

Reviewed by Gary Bryner, Brigham Young University

NEWS OF THE DISCIPLINE

Announcement

Rosemary O'Leary (Distinguished Professor, the Maxwell School of Syracuse University) and Lisa Bingham (Keller Chair of Public Service at the School of Public and Environmental Affairs at Indiana University) won the 2005 award for "Best Book in Environmental and Natural Resources Administration" for THE PROMISE AND PERFORMANCE OF ENVIRONMENTAL CONFLICT RESOLUTION (Resources for the Future Press, 2003). The award is given by the American Society for Public Administration (ASPA).

2005 ASPA STEP Panels, Washington DC

25-7: Business and Environmental Policy
Thursday, September 1, 8:00am
Hotel: Marriott, Room: Virginia B

39-3: Democratizing Nanotechnology—Research and Engagement for Societal Outcomes
Friday, September 2, 8:00am
Hotel: Marriott, Room: Wilson C

39-4: Mobilizing Democracy through Collaborative Environmental Management
Friday, September 2, 4:15pm
Hotel: Marriott, Room: Washington Room 6

39-2: Environmental Policy and Politics in Local Arenas
Saturday, September 3, 8:00am
Hotel: Marriott, Room: Maryland C

39-5: New Institutions in Environmental Policy
Friday, September 2, 2:00pm
Hotel: Marriott, Room: Roosevelt