

Conclusion: *barnessing political chain reactions*

The powerful chain reaction triggered by unprecedented reliance on expert guidance housed in large-scale bureaucratic structures funded at public expense is perhaps the most significant political development in America in the past fifty years. Plotting the course of this chain reaction revises our understanding of the rise and fall of commercial nuclear power in the United States. It redirects the emphasis away from external pressures, whether World War II or growing environmental consciousness, toward the professionals and administrators who staked proprietary claims to this new federal policy. Nuclear power's trajectory, I argue, is best explained by an internal dynamic fueled by the constantly shifting elaboration of expertise and administrative capacity within the nuclear community and the juxtaposition of the promissive state and an older, less professional, and far more decentralized American political landscape. This perspective in turn shifts the chronological focus of my study away from the more dramatic beginning or demise of nuclear power to the crucial years between 1945 and 1975. That story, and the techniques I have used to construct it, however, have broader implications.

For historians, my approach provides a methodology and narrative form that capture the high degree of contingency and political choice embedded in what more commonly have been presented as the overly determined and numbing forces of professionalization, bureaucratization, science and technology. My account repoliticizes large segments of social and public activities often abandoned to the supposedly predictable forces of modernization. At the same time, it captures the incremental compromises negotiated with older political traditions, reminding social scientists of the powerful political legacies of the past. Newly empowered with the authority of experts and the resources of the federal government, the promissive state ultimately had to accommodate the pluralist, porous, and often parochial landscape that continues to shape American politics even today.

My study also begins to lay a new foundation for understanding post-World War II American politics. The politics of commercial nuclear power shared much in common with other post-World War II programs. World War II and the infusion of expertise it inspired was a watershed as monumental as the turn-of-

the-century denouement described by Stephen Skowronek. There, the administrative state replaced a nineteenth-century state of "courts and parties." Following World War II it was the fusion of professional and administrative capacity that again reshaped the political system.

Federally funded experts designed policy agendas with little reference to public demand, yet these agendas often found the inside track to policy implementation. There was plenty of debate among the experts in the promissive state, but initially it took place in highly insulated forums. There was a dynamic to the politics of expertise, however, that virtually ensured a reaction to its protagonists' preference for autonomous policymaking. Faced with flagging demand when it came time to implement their programs, experts and bureaucrats were forced to go public, fighting for shallow but broad public support with promises increasingly difficult to fulfill. Contradictory missions spawned by the experts' organizational loyalties also exposed experts to broader public scrutiny. Specialization, inherent to expertise and administrative control, proved to be the agent most destructive to expert insulation. Specialization spread the debate and destroyed internal consensus on agendas. Ultimately the experts' promotional activities, their pursuit of contradictory organizational missions and the never-ending process of organizational and intellectual specialization undermined the authority of experts.

Though often insulated from public participation, promissive states were never isolated from political competition. As they translated research agendas into new programs they gobbled up turf once controlled by other political participants and created new policy vistas that eclipsed once powerful political actors. Often it was only access to expertise and administrative capacity that stood between traditional participants and the political clout that had formerly been theirs. Ironically, one of the most distinctive aspects of the promissive state – the prolific production of more experts – ensured that access to expertise would not remain a barrier for long. Congressional entrepreneurs, competing federal agencies, state and local government, and, ultimately, issue networks that reached down to mass-based constituencies, all acquired access to expertise. As each new participant entered the fray equipped with its own "independent" experts, the once exalted political clout of expertise waned. Expertise remained a necessary but hardly sufficient component of the promissive state.

LINKING THE BEGINNING TO THE END

The first Hollywood account of the bomb, released by MGM in 1947, was entitled *The Beginning or the End*. The film's title reflected the ambivalence of most contemporary accounts about America's powerful weapon. "The beginning or the end" also neatly describes the two periods in nuclear power's history featured in virtually all of today's scholarly literature.¹ I have concentrated instead

1. For instance, see Rhodes, *The Making of the Atomic Bomb*; Campbell, *The Collapse of an Industry*; and Marone and Woodhouse, *The Demise of Nuclear Energy*?

on nuclear power's crucial developmental years between 1945 and 1975 in order to dramatize two submerged but ongoing challenges that link nuclear power's grandiose origins to its ignominious decline. One plot traces the quest by pro-administrators to create organized demand for nuclear power. The second is built around the inherently contradictory viewpoints embedded in the nuclear community that ultimately undermined the consensus so crucial to the experts' political authority. As demand increased, these rifts were nurtured by the very growth and development that the nuclear community struggled so hard to sustain.

Commercial nuclear power moved directly from the laboratory to the nation's policy agenda: its producers – not its would-be consumers – were its best-organized constituency. Even while the frenzied race for the bomb raged toward its conclusion, administrators and professional researchers planned atomic power's introduction into the civilian world. The political planning was initiated by the nation's first promissors – men like Vannevar Bush and James Conant in the Office of Scientific Research and Development. The OSRD, in turn, was responding to scientific developments at the Manhattan Project's University of Chicago laboratory. Having completed their weapons-related work, scientists there pursued new self-directed research agendas, one of the most attractive of which was producing power from the now-tamed atom. These agendas were rubber-stamped by the new civilian agency, the Atomic Energy Commission. Farrington Daniels was the most aggressive though least successful proponent of civilian nuclear power. Daniels argued that reactors were the most important product of the Manhattan Project. Though Daniels failed to obtain funding for his demonstration reactor, Eugene Wigner, Alvin Weinberg, and Walter Zinn quietly advanced a number of different reactor concepts during the AEC's first five years.

While the laboratory scientists and engineers cleared the way scientifically and technologically, and were a crucial catalyst in placing commercial nuclear power on the policy agenda in the first place, they could not provide the political muscle required to implement a major federal program. That kind of support required public promotion, a task that congressional entrepreneur Brien McMahon and AEC chair David Lilienthal were delighted to pursue. McMahon, no less than the laboratory scientists eager to continue their research, was a producer when it came to nuclear power. Controlling this newly created political turf, though fraught with risks that warned off more seasoned politicians, offered the freshman senator an opportunity to chair a committee rich in foreign and domestic policy possibilities. McMahon jumped at the chance to parlay his position on the Joint Committee on Atomic Energy into a powerful platform. Nor was the senator bashful about public promotion. His effort to establish civilian (which also meant JCAE) control depended in part on convincing his colleagues that nuclear power had significant civilian implications. McMahon pointed to commercial nuclear power as the primary example of such a civilian use.

As chair of the newly created Atomic Energy Commission, David Lilienthal's stake in producing commercial nuclear power was equally high. He understood

the need for an organized constituency and initially hoped to create the same kind of favorable public attitude that had breathed life into the Tennessee Valley Authority. There were, however, no nuclear equivalents of the gadgets that Lilienthal had once piled in front of farmers to demonstrate the practical benefits of TVA power. Instead, Lilienthal faced a series of gloomy predictions by the nation's leading experts about the timing and cost of nuclear power. There was some popular support for an administrative apparatus distinct from the military, but the public soon lost interest in this esoteric field and its administrative details.

By 1950, all of nuclear power's producers – laboratory scientists, Atomic Energy Commission, and Joint Committee on Atomic Energy – recognized that if there was to be civilian demand for nuclear power, it would have to be manufactured by the state. Particularly as the cold war heated up, the military proved to be one open-ended source of demand for reactor development. Admiral Hyman Rickover summed up the situation best when he noted that since there was no economic incentive for the electric industry to invest in nuclear power's development, "the program and the drive must come from the navy itself."² Indeed, the first power-producing demonstration reactor constructed by the Atomic Energy Commission was a direct outgrowth of Rickover's naval propulsion program. Particularly during the AEC's first five years, the military's insistence that scarce enriched fuel and even scarcer expertise be directed toward weapons programs was a barrier, not a boon, to civilian development. Even military projects turned civilian, such as Rickover's Shippingport reactor, were doomed by their disregard for cost – a crucial consideration if nuclear power was going to compete commercially.

Potential nuclear manufacturers were another logical source of demand. Westinghouse and General Electric were aware of the dismal prospects for economically competitive nuclear power, and the great complexities that remained to be resolved. As the Joint Committee on Atomic Energy's most influential member, Chet Holifield, pointed out (in the safety of executive hearings) in 1953, it was odd that the public hue and cry for private ownership of reactors was not coming from the big companies "that really know what this thing is about."³ Starting with David Lilienthal's effort to create a "home" for the nuclear industry in the Atomic Energy Commission, the AEC and the JCAE actively sought to stimulate interest among large manufacturers. That task proved difficult even for as skilled a financier and salesman as Lewis Strauss. Strauss argued that it was up to GE and Westinghouse to help maintain America's status as the world's technological leader. At the same time, Strauss struggled valiantly to ensure that nuclear development heeded the dictates, not just the rhetoric, of free market capitalism. His insistence that manufacturers take risks undoubtedly delayed nuclear development. But it cemented the powerful economic interest group that

² See Chapter 3.

³ See Chapter 4.

the AEC had long sought to develop. By the early 1960s, nuclear manufacturers were themselves seeking to create demand among that industry's most crucial consumers — the nation's utilities.

The problem remained one of basic economics. Because of America's abundant supply of low-cost fuel, nuclear power couldn't compete in the early sixties, even in the best of circumstances. Furthermore, nobody was willing to vouch that such favorable circumstances would prevail for this untested technology. The AEC's reactor development chief summed up the problem in December 1961. "The glamor of being 'first' is no longer there, but the cost of being 'among the first' is."⁴

The Atomic Energy Commission's Report to the President, issued in November 1962, rekindled some of the glamor and substituted rhetoric and optimism for concrete technological developments to surmount the utilities' fears that nuclear power was not economically viable. Seaborg's bold new vision for breeder reactors sought to capture some of the technological glitter recently refracted toward space, while expert assurances that complex technical problems had been resolved and that costs for nuclear power were on the threshold of competitiveness addressed the utilities' questions about the bottom line. Although the report was only one of several factors that helped launch the reactor bandwagon of the mid-1960s, it left its mark, coming at the zenith of America's faith in expertise and confidence in science and technology. That the AEC remained the only authoritative "independent" source of operational and cost data undoubtedly enhanced the report's influence. Given the lengthy period between design and operation of nuclear reactors, the bandwagon gathered a great deal of momentum before utilities acquired some firsthand experience with the true costs and the questionable reliability of nuclear power. Once they did, not even a dramatic rise in fuel costs triggered by OPEC's actions in 1973 could entice utilities to scramble aboard again.

By the mid-1970s, the nuclear community's greatest political asset — its experts' authority — was shattered. A brief headline in the *Washington Post* the morning of October 30, 1984, captured succinctly just how far the dynamic inherent in promissive politics had carried the nuclear community's reliance on "expertise." "DOE Hires Phobia Expert to Examine Public Concerns," the highly skeptical piece proclaimed. According to the DOE's latest hired gun — Robert L. Du Pont, the president of the Phobia Society of America — the 40 percent to 50 percent of the American public that feared nuclear power suffered from irrational fears. Soothing these fears, of course, was crucial to developing nuclear power. For decades, the public consensus maintained by experts within the nuclear community had kept such fears at bay. In fact, until the late sixties, the classified documents within the nuclear community chronicled a litany of concerns that made public opinion on safety issues appear to be naively optimistic about such

matters. This "safety gap," however, evaporated as disputes between those experts seeped into the political mainstream. The Department of Energy could no longer rely on physicists, chemists, and engineers alone to sell nuclear power. Experts from fields as questionable as "phobiology" were now crucial. Despite the cavernous gap in public authority that yawned between an Oppenheimer in 1947 and *Good Morning America* guest DuPont in 1984, the DOE stuck to its promissive formulas. DuPont's was "a legitimate scientific inquiry," a DOE spokesperson told the *Post*. "This is high-quality research being done by someone who is a pioneer in this field. We don't apologize for the study."⁵

The story, however, did not end there. Sure enough, DuPont's techniques were disputed by fellow "phobiologists." Addressing the Phobia Society, Robert Ackerman attacked DuPont's techniques, stating they were "a misuse of psychiatric labeling." This interdisciplinary dispute did not take long to reach a mass audience, appearing on the front page of the *Post* days later. The quick transmission and high profile of the dispute had been helped along by a powerful issue network. The *Post* article also quoted Representative Richard Ortinger, who labeled DuPont's contract a part of the DOE's pronuclear propaganda campaign. A spokesperson for the Safe Energy Communication Council claimed that the DOE was "trying to obscure the problems of nuclear power by shifting the blame to those who have legitimate concerns." The people-versus-the experts framework, as Glenn Seaborg had recognized decades earlier, was not the exclusive property of scholars.

My account suggests that the nuclear experts' authority was shattered by projecting internal debate beyond the insulated forums that had once contained that debate. There was a clash of "values," as Seaborg and most scholars were quick to point out, but it was influenced as much by competing disciplinary perspectives and organizational missions as by anti-intellectualism or an attack on science or authority. Many of the accusations hurled by protesters in the late seventies owed their history to questions raised by leading experts working within the nuclear community decades earlier. Those doubts, however, had been confined to insulated forums and initially reached limited audiences. It is not surprising that the challenge to siting nuclear plants, for instance, should be associated with protestors like Samuel Lovejoy, who in the mid-seventies toppled a meteorological tower to stop a proposed plant in Montague, Massachusetts. No doubt Lovejoy epitomized all of the "anti" trends associated with the counterculture of the late sixties. But Lovejoy acted precisely to publicize his concerns, and he realized his objectives. A long line of experts working within the nuclear community, starting with Edward Teller and including some of the AEC's leading authorities on safety, also raised serious questions about reactor siting and containment. Virtually all of them, however, were committed to the political strategy of "containment." Publicity was the last thing they wanted. They

4 See Chapter 7.

5 *Washington Post*, October 30, 1984, p. A1.

understood only too well that their broader political clout rested on public unanimity.

Initially, these experts and the administrators that supported them had a number of advantages when it came to debating differences among themselves and then closing ranks publicly. Following the war there were just a handful of experts familiar with nuclear reactors. Their field was highly esoteric. Development and safety concerns were undifferentiated – the same scientists were responsible for both. Two disciplines – physics and chemistry – dominated the field. There was only one agency (the AEC), one oversight committee (the JCAE), and one political jurisdiction (the federal government) involved in development and safety. Perhaps most significantly, nuclear power was in the early planning stages. Full-scale implementation was decades away.

Like the components of a nuclear chain reaction, however, each element crucial to nuclear power's inception proved highly unstable. The mixture of expertise, administration, and politics that initiated this chain reaction was constantly reconfigured, initially because of internal, not external, pressures. This in turn took its toll on the insulation and the experts' public unanimity so crucial to triggering the program in the first place. Two responsibilities inherent to successful policymaking in the promissive state stretched "political containment" to the breaking point. One was the promotional obligations imposed upon advocates of programs lacking organized political support. The second was a product of the discretion nuclear proponents carved out after World War II, the luxury of self-regulation. Once it became exposed to the elaboration of professional agendas and the articulation of organizational structures, bombarded by conflicting disciplinary perspectives, and threatened externally by a host of interests – ranging from federal agencies to independent citizens groups newly armed with expertise of their own – even nuclear policymaking mutated toward a more democratic and participatory style of politics. Whether its advocates could then sell a program for which there was still no organized consumer demand remains an open question even today.

Promotion sometimes led to inherently contradictory objectives. For instance, the most important promotional function provided by nuclear experts during the program's early days was assuring the public that this energy source was safe. Yet utilities would not consider investing in nuclear power unless the federal government provided indemnification against accidents. The Price-Anderson Act, passed in 1957 to do just that and still in effect today, owed its political life to expert demonstration that a nuclear accident, should one occur, would be so catastrophic that private insurers could not possibly be expected to take such a risk. The experts delivered, producing the WASH-740 report that projected deaths in the thousands and property loss in the billions should a catastrophe occur. Try as it might, the AEC could not make WASH-740 disappear after it had served its political purpose. It became a rallying point for those who doubted the safety of nuclear power plants.

To stimulate demand for nuclear power, the AEC also embarked on a high visibility campaign to market a technology that it argued was on the threshold of competitiveness. Increased visibility and marketing responsibilities for experts were not coincidental: they were integrally related to sparse demand for expert-generated agendas. In the case of nuclear power, promotion paid off; it contributed to the reactor "bandwagon" of the mid-sixties. Here, too, however, contradictory demands were placed on experts by the nature of their mission. Since nuclear power was so competitive, some politicians asked, why were large federal subsidies required? Why, asked the coal lobby, did the Atomic Energy Commission, despite billions of private investment dollars flowing into commercial nuclear power, insist that nuclear power had no "practical value"?

Self-regulation, when exposed to the dynamic developments within the professions and organizations on which it relied, proved even more corrosive to the strategy of "political containment" than the experts' contradictory promotional responsibilities. Specialization – both bureaucratic and professional – was one significant contributor to the decline of expert authority. Here, the experts' tendency to narrow and deepen their inquiry fit readily into the bureaucracy's organizational preferences. The question of nuclear safety was addressed by just such a division of labor, a division that was institutionalized as a series of specialized organizational units within the Atomic Energy Commission. This had the effect of formalizing debate between the experts. Although each unit was committed to sustaining vigorous internal debate and to reaching a consensus for public consumption, each was also tempted to breach that consensus when its organizational mission was threatened. This destabilized the process by which public consensus was achieved within the expert community. Over time it broadcast what had been an internal debate to wider audiences.⁶ The pressure was so great that even as staunch an advocate of secrecy as Harold Price, the AEC's director of licensing, was forced in the early sixties to call for a public moratorium on urban siting.

The scope of debate was also inexorably broadened as the experts developing nuclear power tackled complex agendas that cut across professional disciplines.⁷ In organizational terms, these issues spanned agency and federal jurisdictions as

6 There is a significant literature discussing the breakdown of public consensus within the professions. See, for instance, Haskell, *Authority*, pp. xiii–iv; Aaron, *Politics*, pp. 155–9; Heller, "What's Right with Economics," pp. 1–3; Culliton, "Science's Restive Public," p. 149; Hohenemser et al., "The Distrust of Nuclear Power," pp. 25–34.

7 The concept of expanding the scope of debate is based on E. E. Schattschneider's discussion of "managing the scope of conflict" (*The Semisovereign People*, especially ch. 1, "The Contagiousness of Conflict").

John L. Campbell adds a valuable refinement to Schattschneider, noting that the policymaking stage in America tends to be far more insulated than the implementation stage (*Colliage*, ch. 5). This certainly applies in the case of nuclear power, as Campbell deftly demonstrates. Like other scholars, however, Campbell frames his analysis in terms of the people versus the experts, thus missing the structural reasons behind the expanded scope of debate and conflict within the expert community.

well. As each new discipline was drawn into the discussion, its representatives – now fused to an institutional base – brought with them their agency and state, local, or federal allegiance. They also brought the varied perspectives that such amalgams of discipline and political institutions tended to produce. Committed to particular issues, these networks of officials and consultants further broadened the debate, and extended it to the full range of forums available in America's decentralized, pluralist political system.⁸ Unlike the iron triangle bounded by AEC, Joint Committee on Atomic Energy, and nuclear industry, these networks did not necessarily consider the development of a standardized national program for nuclear power to be their top priority. Depending on the makeup of each issue network, states rights, public health, and water standards, for example, might be far higher priorities. Abel Wolman stood at the center of just such a network, urging his environmental engineering and public health colleagues to look into the safety of nuclear power. The U.S. Geological Survey and Secretary Stewart Udall engaged yet another. By the 1970s, an increasing number of crosscutting concerns challenged the production-oriented approach implicit in the nuclear iron triangle, and reflected quality-of-life issues that lay at the heart of the growing environmental movement.⁹

Experts were everywhere by 1975. At its inception, the Atomic Energy Commission so dominated the handful of experts in the field that the Joint Committee on Atomic Energy found it difficult to oversee that agency's activities. The nation's only congressional oversight body itself had limited access to expertise. But the proliferation of experts – a direct product of the federal government's new role in the production of expertise – made them available to a whole range of political actors who originally had been left out of the esoteric world of nuclear power.

By the mid-1970s, policymakers were deadlocked, with experts seemingly on all sides of every issue. Yet no combination was able to deliver a knockout punch. By this time, national citizens groups, citing experts of their own, had weighed in. This dramatized the situation. Public disputes between experts left the program adrift, and the public confused. Experts were doing what they had always done – expressing a range of viewpoints while debating their colleagues – but now they were doing it publicly, and in increasingly political forums. In 1973, Senator Pastore summed up the results of this phenomenon, noting that the public was confused because it was not being told in categorical terms “yes and no.” And what is even worse, the Joint Committee on Atomic Energy chair continued, “is the fact that right within the agency, [Atomic Energy Commission] itself, you haven't made up your minds.... You have people who are being paid

8 On issue networks, see Heilo, “Issue Networks and the Executive Establishment,” in King, ed., *The New American Political System*.

9 On the transition from production-oriented to quality-of-life related federal policies, see Hays, *Beauty, Health, and Permanence*, introduction and ch. 1.

to do a job who are saying that it is good and other people who are being paid to do the same job who say that it isn't good.”¹⁰

The elaboration of expertise into specialized units, the inevitable differences in perspective that arose when a number of disciplines examined the same problem, and the political agendas engaged by various host institutions brought disputes between experts to the public's attention. Despite a natural inclination toward a more insulated policymaking style, experts were also forced to enter highly visible arenas in order to garner necessary public support. At times, it was the experts who aroused the people. At a minimum, these visible fissures between experts undermined public confidence in expertise. It was the elaboration of expertise within the decentralized and specialized American political system, not an attack on Galileo, that waylaid the nuclear bandwagon.

REPLICATING THE RESULTS

The patterns I have discerned in the history of commercial nuclear power have both molded and buffeted a broad cross section of federal policies since World War II. The dynamic forces set in motion by promissive politics are not readily apparent, however. I have been able to reconstruct some of them by drawing on and synthesizing important new currents in historiography and the social sciences. If similar “chain reactions” have swept through other policy areas, we will not be able to replicate them without a clear idea of what to look for and how to look.

As historians began to recognize several decades ago, the key to understanding twentieth-century American politics lay in shifting political history's concern with electoral politics and presidential leadership toward the study of bureaucratization – its causes and its impacts. An approach to history labeled “the organizational synthesis” did just that.¹¹ While Parsonian and Weberian sociology steered the original organizational scholars toward rigid functionalist portrayals of bureaucracy, subsequent work in the social sciences shifted the debate from description to an exploration of the sources of power.

At the same time that social scientists reexamined organizational theory, they revised their views on the sources of professional autonomy. Increasingly, sociologists rejected structure-functionalist descriptions of professionals that assumed experts existed and were granted authority because a complex and interdependent society required it.¹² Instead, scholars explored how these experts

10 U.S. Congress, Joint Committee on Atomic Energy, “Nuclear Reactor Safety Hearings,” 93rd Cong. 1st sess., 1973 (published 7/75), January, 23, 1973, p. 6.

11 For an extended discussion of the organizational synthesis, see Balogh, “Reorganizing the Organizational Synthesis.”

12 Peter B. Evans, Dietrich Rueschmeyer, and Theda Skocpol, *Bringing the State Back In* (New York: Cambridge University Press, 1985), p. 4.

achieved their power.¹³ Historians, employing this new sense of skepticism, have begun to analyze professional development in the same terms used to analyze other groups, asking how professionals shaped social, political, and cultural relations.¹⁴ Much as particle physics shattered scientists' notions of what constituted the building blocks of nature, the revolt against Parsonian structure-functionalism in the social sciences challenged historians' lock-step conceptualization of bureaucratization, professionalization, technological advance, and evolution from entrepreneurial to corporate capitalism.

Historians, on the other hand, have some valuable perspectives of their own to contribute to the sensitive technology required to follow politics into its administrative and professional forums. As Stephen Skowronek demonstrated, American would-be state builders were forced to come to grips with the antistatist culture in which they operated. Cultural historians recently have stressed the interplay between values championed by the rising professions and more deeply rooted cultural beliefs.¹⁵ It was not promotional obligations, specialization, and interdisciplinary approaches alone that broadened the scope of debate in nuclear power. Rather, it was the interaction between these tendencies and America's strong commitment to free market capitalism on the one hand, and multiple points of political access on the other, that shattered the experts' public consensus. The promissive tendencies in post-World War II America permanently altered the political system but hardly eradicated powerful traces of its antecedents – administrative state or, for that matter, "courts and parties." In fact, the long-term success of expert policy agendas often turned on their advocates' ability to translate the policy's benefits into a currency more familiar to traditional political actors – whether contracts for a key legislator's district, the promise of more resources for an agency head, or economic protection for a tightly organized interest group.

Each element that contributed to nuclear power's political chain reaction shaped – often decisively – a wide variety of post-World War II programs. Before illustrating that point, let me reiterate the promissive pattern I have discerned

13 The best summary of this literature is Friedman, "Are Professions Necessary?" in Haskell, *The Authority of Experts*.

14 The best example of this is Haskell, *The Emergence of Professional Social Science*.

15 John Higham, "Hanging Together: Divergent Unities in American History," *Journal of American History* 61 (June 1974); Richard L. McCormick, "The Discovery that Business Corrupts Politics: A Reappraisal of the Origins of Progressivism," *American Historical Review* 86 (1981): 247–74.

In both the Higham and McCormick models, the technical-professional interests outlasted the wave of broader public concern and involvement. Both Thomas McCraw, in *Prophecy of Regulation*, and Tomlins, in *The State and the Union*, have shown in their studies of regulators that the professionals were hardly insensitive to popular beliefs. Perhaps the best example, however, of how cultural values influenced professional perspectives is Allan M. Brandt's study of venereal disease – *No Magic Bullet: A Social History of Venereal Disease in the United States Since 1880* (New York: Oxford University Press, 1987). Prevailing attitudes toward sexual practices and class bias, Brandt argues, helped shape the way doctors and scientists defined and treated venereal diseases. This proved to be a major factor in explaining why venereal disease failed to join the list of infectious diseases eradicated by medicine in the early twentieth century.

in nuclear power in its simplest form. The process began with agenda setting. Expert-driven policy agendas sought to extend the boundaries of professional research agendas or to apply new research findings on a large-scale basis in order to achieve social benefits. In either case, the need for funding, comprehensive organizational capacity, and control over complex policies that ultimately would touch the lives of millions drove professionals into an alliance with the federal government, and prompted professionals to trade a portion of their autonomy for an alliance with federal administrators. While policy planning occurred in highly insulated forums, the resources required and, in some instances, the political impact anticipated required that promissive sell their programs, often in dramatic fashion. From the start, the major developmental obstacle for promissive policies was demand from would-be consumers. Promissive policies were producer- not consumer-driven, and producers labored to create the kind of lasting interest group support required to institutionalize their programs. At the outset, the promissive's greatest asset – the authority of the programs' experts – was also its most vulnerable commodity. The need to market programs' services clashed with the desire for political insulation. More significantly, expert authority was highly dependent on the maintenance of public consensus among experts. As policies moved from planning to implementation, a number of tendencies pushed expert debate out of insulated forums into more public arenas. The most important of these was specialization – both professional and organizational. Another was the interdisciplinary approach required to implement complex programs. A final tendency was the proliferation of experts in large part generated by the promissive themselves. The proliferation of experts allowed political actors previously excluded from the program to join the debate and introduce a variety of political perspectives into it. Issue networks linked to competing agencies at all three levels of America's federal system were often the critical agents. They spread debate from the institutional arena to broader audiences. The cacophony of competing expert opinion eroded the special advantages held by promissive at the outset, and forced programs toward more traditional bases of interest group or partisan support. The simultaneous erosion of expert public consensus across a spectrum of policy areas undermined the general confidence in experts – regardless of their particular field. Thus experts today begin from a very different base of support than they did thirty years ago. Nevertheless, America remains more dependent on its experts than ever.

In turning to the first phase in the promissive pattern – expert agenda setting – America's post-World War II history is indeed ironic. Many of the agendas adopted by critics of existing scientific or technological practices – whether efforts to eliminate pollution, or challenges to radiation standards – originated with new and improved scientific or technological abilities to measure and test. Though often seen by their adversaries and scholars alike as antiscientific or antitechnological, critics were highly dependent on the latest scientific thinking

and technology for measuring effects on the body or the environment. "As science advances and our ability to detect risks improves, our opportunities for influencing risk have proliferated," a *Science* article evaluating epidemiology stated.¹⁶

Greater capacity to detect, however, led directly to new policy agendas. The decision to undertake the study in the first place was often the result of a policy decision made by promissors at the federal level. More often than not, such decisions were guided by professional and agency research agendas, not organized political demand from the population targeted for services or treatment. As Alvan Feinstein, director of Yale's clinical epidemiology unit, put it, "The episodes have now developed a familiar pattern. A report appears in a prominent medical journal; the conclusions receive wide publicity... and another common entity of daily life becomes 'indicted' as a 'menace' to health – possibly causing strokes, heart attacks, birth defects, cancer." The reported evidence, he continued, "is almost always a statistical analysis of epidemiologic data, and the scientific tactics that produce the evidence are almost always difficult to understand and evaluate."¹⁷ Tens of thousands of such decisions to embark on new federally funded research were made each year, flooding the nation's research agendas.

For example, in 1984 the *New England Journal of Medicine* published a pair of scientific studies that implicated even moderate use of alcohol in the development of breast cancer.¹⁸ Other recent examples of expert agenda-setting included charges that silicone implant surgery was linked to cancer in rats, that depression was far more debilitating than previously recognized, that the Environmental Protection Agency had neglected some of the most hazardous risks – such as indoor pollution – or that the ozone layer was disappearing.¹⁹ In each instance, experts played a leading role in determining what would be studied and how. The answers to this first set of questions in turn led to a new set of questions and policy recommendations, ranging from warnings printed on beer bottles to calls for international mechanisms to deal with the effects of global warming.

In all of these instances, federal experts were integrally involved, either in granting funds for the original research or requiring and analyzing the data submitted. One-third of the funding for the depression study, for instance, came from the federal government, the EPA sponsored the study of its own priorities, NASA flew into the ozone hole, and the silicone discovery was based on data submitted by a drug-manufacturing company to get Food and Drug Administration (FDA) approval.²⁰ The relationship between these scientifically

driven agendas and the federal government, however, did not end there. The National Center for Health Services Research and Health Care Technology Assessment, the National Institute on Aging, and the National Institute of Mental Health will no doubt play a crucial role in implementing studies' recommendations. Their fate ultimately will turn on federal agencies' ability to incorporate findings into the massive federal grant programs, particularly Medicaid and Medicare, administered by the federal government. EPA and its congressional oversight committees ultimately will determine whether past environmental priorities are revised. The FDA must make the final decision on the safety of implants. The very timing of NASA's exploration of the ozone hole was the product of promissive decision making. "If this were for pure science," commented chief program scientist Robert Watson, "we would have waited another year, but because of the importance to society and policy, we felt it would be wrong to wait."²¹

Administrative and expert agendas seemed inextricably linked. This was one of the cornerstones of the promissive alliance. When completed, expert research spawned a number of new policy recommendations. To be sure, more research was one of the most common recommendations. Often, however, the study also called for additional federal action. Economists, for instance, could theorize at universities to their heart's content, but as Leonard Silk reported in his *New York Times* column, the "Economic Scene," "truth is of scant value unless the public and government respect it and use it."²² It was no different when it came to the nation's nutrition. Improving nutrition could best be addressed through federal aid to school lunch programs, hospitals, nursing homes, and food stamps. The most direct existing path cut through the armed forces and subsidiary veterans' benefits. Both bureaucracies had long served as models for social programs ranging from universal access to prenatal care to tuition support. In other words, not just federal dollars were required – although that always seemed to be an important prerequisite – federal administrative capacity and authority were required as well if experts hoped to have a social impact.

That impact, however, was often sought more fervently by providers than by would-be consumers. Organized consumer demand turned out to be harder to create than pathbreaking science or technology. An article in the *New York Times* neatly captured this dilemma.²³ A gripping photograph showed a premature infant (born to a drug-addicted mother) and its teddy bear engulfed by a contraption that was obviously keeping the child alive. Graphs told the bleak story. The decline in America's infant mortality had leveled off; the gap between blacks and whites had actually increased in percentage terms. The central theme of studies released by the Bush administration, the National Academy of Sciences, and the National Commission to Prevent Infant Mortality, was that the United States

21 *Boston Globe*, September 1, 1987.

22 Leonard Silk, *New York Times*, January 3, 1986, p. D2.

23 *New York Times*, August 12, 1990.

16 Richard J. Zeckhauser and W. Kip Viscusi, "Risk Within Reason," *Science* 248 (May 4, 1990): 563.

17 Alvan R. Feinstein, "Scientific Standards in Epidemiologic Studies of the Menace of Daily Life," *Science* 242 (December 2, 1988): 1257.

18 Stephen Lyons, "Crying Wolf About Risks?," *Boston Globe*, October 16, 1989, p. 29.

19 On silicone, see *Boston Globe*, November 11, 1988, p. 3; on depression, see *Boston Globe*, August 18, 1989, p. 1; on revised risk priorities, see *Boston Globe*, September 12, 1988, p. 1; on ozone hole, see *Boston Globe*, September 1, 1987, p. 2.

20 *Boston Globe*, September 1, 1987, p. 2.

had the techniques available to reduce infant mortality substantially without spending billions. There appeared to be only one hitch, summed up by Dr. Anthony Robbins, former president of the American Public Health Association: "You have to create a demand for services, for prenatal care, through education and marketing."²⁴

Some of America's more abstract promissive programs so outpaced demand that it was not even clear what services they might provide. The space station was a classic example. In FY 1989, NASA earmarked \$900 million to begin work on a space station expected to cost more than \$30 billion by its completion before the end of the century. But as Albert Wheelon, a retired aerospace executive and member of the president's commission to investigate the *Challenger*, put it, "One problem with the space station is that we are not sure why we are building it."²⁵ Some speculated that without the space station, the multibillion-dollar space shuttle might have little else to do once the backlog from the *Challenger* accident was completed. The nub of NASA's problem, wrote one *Times* reporter, was "that it finds itself with the means, an advanced transportation system, and no ends."²⁶ Or, as the Congressional Budget Office cautioned, "the future NASA program will become increasingly determined by choices made years earlier: Strong incentives will exist to fund new missions in order to rationalize the use of the infrastructure already provided."²⁷ Public opinion polls showed that there was broad, albeit shallow, support for the program. Given the competition for funds in the 1990s, that may not prove sufficient for implementation. NASA's ability to sustain organized support will ultimately determine that agency's fate.

Enter the promissive state. In ways remarkably similar to those documented in the history of commercial nuclear power, the Reagan administration launched a program of "privatization," designed to create demand for space services such as rocketry, space stations, and space cameras. The race for international prestige was now against the Japanese, not the Soviets. "It's worth noting," a Commerce Department official warned in a recent speech, "that the two largest Japanese construction companies... both have space project offices which are today designing spaceports and moon bases."²⁸ There have also been calls for the federal government to limit liability in case of accident. Experts, the *Times* reported, "say similar limits helped spur the founding of the nuclear-power industry."²⁹

At the same time that some space promissive programs labored mightily to create demand, others struggled to keep their heads above an avalanche of unused data already beamed back from space. Known by insiders as the "Black Hole," a huge federal warehouse at the Washington, D.C., National Records Center housed more than 70,000 tapes in an area the size of eighteen football fields (nicknamed by some scientists "tape landfills"). Hundreds of thousands more tapes were

24 *Ibid.* 25 *New York Times*, October 9, 1988, p. E2. 26 *Ibid.* 27 *Ibid.*

28 *New York Times*, January 24, 1988, p. 1; quotation from p. 28.

29 *Ibid.*, p. 28.

scattered around NASA labs throughout the country. NASA scientists, it turned out, had only been able to analyze closely one percent of the tapes. Yet nobody at NASA suggested that perhaps we did not need all of this data. Rather, as William J. Campbell, who heads an artificial intelligence program at Goddard, sees it, NASA had to spend more on its software so that it could analyze all of this data. Nor was NASA unique. As one computer scientist at Goddard Space Center emphasized, the mismatch between raw data and real analysis plagued policies ranging from energy exploration to medical imaging. "Everybody has the same problem, NASA's just ahead of the rest."³⁰

Given the Herculean task of organizing demand that it faced, it is not surprising that NASA, like the Atomic Energy Commission, actively cultivated a powerful lobby of suppliers. By 1987, however, the agency had overstepped even its own sense of propriety. This occurred when NASA's Office of Industry Affairs sent a memo to contractors asking for their help in lobbying Congress at budget hearings. The memo requested that contractors report back within nine days on the results of their efforts.³¹ Although NASA eventually apologized to Congress for this violation of the law, NASA spokesperson David Garrett sounded less than chastened. "I think every agency in town certainly does things to protect their turf," Garrett insisted.³²

Although NASA symbolized the extremes of the promissive struggle to generate organized demand and sell its program in the absence of demand for its services, its tendency to create new demands in order fully to utilize past resources was typical of patterns in other policy areas. The study of depression cited earlier underscored the need to diagnose depression properly, particularly for patients who are not complaining of depression. The discovery of such high rates of depression – including sizable numbers of patients who did not know they were depressed – obviously called for major changes in the way patients were screened.³³ The EPA study concluded that the agency "desperately needs a long-term research and development program" and called for the creation of an environmental research institute.³⁴

Experts turned to the federal government in part because it assured them an environment relatively insulated from other political interests in which to carry out research and promised them a relatively large degree of control over the implementation of their research findings. In return, experts promised federal administrators a reliable, often predictable, and most of all respected source of meeting poorly articulated political demands. The requirement that experts engage in highly visible public salesmanship, however, clashed with the desire of all promissive programs to maintain the insulated environment crucial to the control they sought.

Experts often regretted the publicity that they eventually received. Few,

30 *Ibid.* 31 *Boston Globe*, September 1, 1987.

33 *Boston Globe*, August 18, 1989, pp. 1, 6.

34 *Boston Globe*, September 12, 1988, p. 1.

however, understood the degree to which that publicity ensured their very professional survival. Brian MacMahon, chair of epidemiology at Harvard's School of Public Health, for instance, wrote a 1981 study that linked coffee to pancreatic cancer. When attacked, he acknowledged that it would have been better to publish his work in a more obscure journal. As he told a *Boston Globe* reporter, had he done that, "It would have come to the attention of the scientists, but there would not have been the hoopla that there was about it."³⁵ Had MacMahon published only in obscure journals, however, it is not clear that he would have obtained crucial funding for the project in the first place.

Proministrators were well aware that insulation was crucial to success. Nor did they need the shield of national security to establish initially what they considered to be the requisite degree of insulation (although it undoubtedly helped). Whether researching the ozone hole, lobbying for the privatization of space, reducing infant mortality, or setting dietary standards, proministrators managed to keep their reports private – at least for a while. In the case of ozone, the official justification cited international treaties about reducing industrial chemicals. The press was denied access to Reagan's privatization plan, the White House task force on infant mortality's report, and the National Academy of Sciences report on dietary standards.³⁶

Regardless of the conscious efforts made to preserve promministrative insulation, the processes of specialization, the need for multidisciplinary approaches to complex problems, and the proliferation of experts and agencies continued to erode any such efforts. Specialization seemed to hit economists the hardest. The *Journal of Economic Perspectives* was established in 1987 specifically to get economists to communicate across their specialties and start talking to each other again.³⁷ Specialization was at work in epidemiology as well where the emergence of the subspecialty directed toward noninfectious disease expanded the reach of the discipline but also led it toward more tenuous conclusions. As Alvan Feinstein put it, "statistics are like a bikini bathing suit: what is revealed is interesting; what is concealed is crucial."³⁸ Feinstein's was hardly the first critique penned by an epidemiologist directed toward his colleagues. Most of its antecedents, however, had appeared in specialized journals, fueling the intraprofessional debate, but at the same time containing it within the boundaries of the profession.³⁹ It is not surprising that given the nature of scientific debate, the openness of American communications, and the public interest in health, the epidemiological debate spread to more public forums. As Noel Weiss of the University of Washington noted, "the problem is that other people are listening to us communicating, and they're making more out of it than we are."⁴⁰

35 *Boston Globe*, October 16, 1989, p. 30.

36 On ozone, see *Boston Globe*, September 1, 1987; on infant mortality, see *New York Times*, August 12, 1990; on dietary standards, see *New York Times*, October 8, 1985.

37 *New York Times*, September 27, 1987. 38 Feinstein, "Scientific Standards," p. 1263.

39 *Boston Globe*, October 16, 1989. 40 *Ibid.*

Even in America's most highly insulated forums, however, the specialized debates that began behind barriers of self-consciously maintained and legally protected secrecy, relentlessly crept toward more public forums. No debate was more closely guarded than that surrounding America's production of nuclear weapons. Although it took decades, even in this field, internal criticism ultimately made its way into the headlines. Specialization, the division between those charged with producing weapons and those charged with ensuring their safety, was again the driving force behind these revelations. A *Boston Globe* editorial sized up the situation at America's first weapons production plant in Hanford, Washington, labeling the latest revelations of nuclear waste dumping "numbing proof that excessive secrecy, single-mindedness and fear can add up to shockingly irresponsible behavior." The source of the revelations publicized by the *Globe* was "specialist" Cleve Anderson, who ran a committee studying long-range nuclear waste management at Hanford in the 1950s. Anderson ultimately had to file a Freedom of Information request to obtain and make public his own report. While it took Anderson decades to substantiate his charges of cover-up, an intense debate between development and safety interests in weapons production was covered by the *New York Times* at virtually the same time that the debate unfolded within the Department of Energy in late 1988. As the lead paragraph in the *Times* coverage put it, "A dispute between safety specialists and production managers in the Energy Department erupted in public today over when it will be safe to reopen a nuclear reactor that makes bomb fuel."⁴¹

As policymakers sought to tackle increasingly difficult problems, they employed a variety of professional disciplines. These disciplines and their organizational hosts often worked at cross-purposes. It was NASA database expert Barry Jacobs and/or "frustrated" James Green, head of NASA's National Space Science Data Center, who fueled the flap over unused space data. And artificial-intelligence director William Campbell told the *Journal* reporter that the \$2 million (out of a \$7.8 billion budget) earmarked by NASA for new software techniques "is peanuts."⁴² In the battle against AIDS, presidential commissions and popular accounts stressed the problem of feuding disciplines and jealous agencies. Conflicts between the National Institutes of Health and the Centers for Disease Control, for instance, and scientists competing for limited grant money retarded the effort.⁴³ Even the seemingly innocuous campaign for "designated drivers" came under fire, once it was closely scrutinized by psychologists employed by market research agencies. Because teens viewed the designated driver as a parent, the deputy director of research for the firm Saatchi and Saatchi told a *Boston Globe* reporter, "they feel compelled to overturn the parent and in many cases, they try to get him drunker than they are."⁴⁴ Major accounting firms discovered they could make

41 *New York Times*, December 10, 1988, p. 10. 42 *Wall Street Journal*, January 12, 1988.

43 Diane Johnson and John F. Murray, "AIDS Without End," *New York Review of Books* (August 18, 1988), p. 58.

44 *Boston Globe*, September 29, 1988, p. 7.

more money and argued that they could do a more comprehensive job if they supplemented traditional financial audits with management-consulting and data systems analysis. Improving a company's bottom line, however, was not necessarily compatible with certifying the accuracy of that bottom line.⁴⁵ The interdisciplinary conflict was far more intense in more esoteric programs such as genetic engineering, where ecologists charged that a National Academy of Sciences panel appointed to study the safety of these new techniques was biased toward genetic engineering because molecular biologists outnumbered ecologists in the NAS.⁴⁶

From the public's point of view, experts seemed to be everywhere by the 1980s. "Television and radio are chockablock with experts, seething with specialists prepared to advise on matters that span the range of human interests," wrote one *New York Times* columnist.⁴⁷ "You need only pick up a telephone to ask for expert help," she continued. In the nation's courts, trials increasingly became duels of expert witnesses.⁴⁸ The talking heads — "a legion of consultants and analysts" — as one journalist put it, dominated election campaign coverage in 1988. As another columnist concluded, they also dominate parenthood. "Experts tell parents how to have sex, how many children to have and how to raise them. They tell women how to behave during pregnancy and make many feel guilty if they decline natural childbirth or cannot breast-feed adequately. Experts coach parents on turning little tots into serious academics or 'superbabies.'" ⁴⁹ So that they could be the experts of the future?

Specialization, multidisciplinary approaches to problem solving, and the sheer proliferation of expertise combined to make experts more accessible to political actors who had at one time been excluded from esoteric policy debates. Issue networks were the primary agent connecting a growing community of experts to these would-be policymakers. As the number of participants involved in policy debate increased, the means of communicating became more public and more accessible. Where internal memoranda once laid out options to a handful of decision makers, speciality book publishers mass-produced monographs designed to influence other experts, lobbyists, consultants, and politicians. With presses and bookstores for every political persuasion, what had been fierce scholarly debate was translated into strident public battle.⁵⁰

Coursing through federal agencies, congressional committees, state and local governments, even citizens groups, experts linked issue networks to mobilized constituencies. Sometimes citizens groups led elected officials and state and local bureaucrats into the fray. When Public Citizen, a Washington-based Nader-founded group, released the results of a study charging that radon tests were

45 *New York Times*, May 13, 1984, 3, p. 1.

46 *Boston Globe*, August 24, 1987, p. 44.

47 Ellen Currie, "Hers," *New York Times*, July 31, 1986, p. C2.

48 *Boston Globe*, August 6, 1989, p. 25.

49 Mary Meehan, "Experts and Wisdom," *Baltimore Sun*, p. A11.

50 Suzanne Gordon, "Public Policy Publishing: Lobbying in Print," *Washington Post*, "Book World," July 28, 1985, p. 5.

inaccurate, federal and state regulatory bodies quickly began testing of their own. Although these agencies argued that the net effect of the Public Citizen group's report was to increase the risk of radon poisoning (because even inaccurate tests warned the public of dangerous radon levels), the same agencies increased their overall level of scrutiny.⁵¹ Relying on their own experts, close readings of publicly available reports and correspondence, and informal contacts with disgruntled agency experts, citizens groups were instrumental in publicizing internal promissive debates. The flap over the safety of reopening weapons fuel production reactors, for instance, was made public at a forum sponsored by the Nuclear Control Institute, a group opposed to the proliferation of nuclear weapons.⁵² The Public Citizens Health Research Group set off the uproar about the safety of silicone implants by publicizing the data submitted to the FDA by Dow and calling for a ban on the procedure.⁵³ The Southern California Federation of Scientists, a group opposed to the Strategic Defense Initiative, was instrumental in publicizing internal criticism of SDI's technical progress.⁵⁴

More often than not, however, the scope of debate was broadened by elected officials, or political jurisdictions that had previously been excluded from the discussion. For instance, by the spring of 1984 two House committees were looking into the issue of auditor independence and the Securities and Exchange Commission's oversight of that process, at the same time that the Federal Deposit Insurance Corporation prepared to bring suit against five accounting firms.⁵⁵ The most devastating attack on SDI's technical capabilities came from scientists at the forefront of the government's efforts. "I'm very alarmed at the degree of hype, promises and a failure to focus on what this national program really is — a research program with lots of unanswered questions," Dr. George Miller, director of defense programs at Livermore National Laboratories told the *New York Times* in December 1985.⁵⁶ It was congressional opponents, however, who relied on internal disputes to break the story open. As the *Boston Globe's* lead headline shouted on Sunday, June 12, 1988, "Senate Study Contributes to Avalanche of Doubts on SDI." The article chronicled the negative findings of the Senate staff report, which was based on "classified briefings and interviews with 120 scientists and technicians involved in SDI." Another Senate probe led by John Glenn, directed at the nation's weapons production plants, exposed rifts between the experts. It was Glenn's hearings in September 1988 that revealed a memo written by a Department of Energy contractor chronicling a history of serious accidents at the South Carolina weapons production reactor. The accidents had never been publicly exposed before.⁵⁷

Whatever the sequence, access to expertise appeared to be one ingredient crucial to joining the debate. The newer political actors had less incentive to

51 *New York Times*, April 8, 1989, p. 11. 52 *New York Times*, December 10, 1988.

53 *Boston Globe*, November 11, 1983. 54 *Boston Globe*, October 21, 1987.

55 *New York Times*, May 13, 1984. 56 *New York Times*, December 16, 1985, p. 1.

57 *New York Times*, November 28, 1988, p. 1.

maintain any semblance of public consensus. In the case of America's nuclear weapons production plants, members of the congressional committee directly responsible for overseeing these operations – the Armed Services Committees – missed the problem because they had relied too heavily on DOE expertise.⁵⁸ Other committees were hesitant to take on the issue for lack of independent expertise. As one congressional staffer put it, "there is an intimidation factor at work. Because there are no scientists on their payroll the committees have to accept the word of the Department of Energy and its contractors."⁵⁹ Once it became apparent, however, that experts within the DOE were sharply divided, politicians and agencies previously excluded scrambled to gain access to experts who were in turn eager to spread the debate into a political forum more conducive to their point of view.

The political actors that moved most effectively to do that were the states. By the end of 1988, even in South Carolina, which had a long history of state-promoted nuclear industry and housed 1,700 DOE workers, some local and state officials led the charge against building a new weapons production reactor.⁶⁰ The state's top environmental official acknowledged that the government "got caught up in a time warp in the late 1970s" and "found itself 20 years behind."⁶¹ Environmental officials in Ohio were more aggressive. Originally told by the federal government that the state "did not have the expertise to regulate Portsmouth weapons facilities," Ohio's governor, Richard Celeste, in December 1988 obtained the nation's first legally enforceable court order mandating that the DOE clean up the Portsmouth site. "Their initial position was nobody including the U.S. Environmental Protection Agency, had any authority over them," gloated Ohio's attorney general, Anthony Celebrezze, Jr. "They've come a long way in their attitude."⁶² When the issue was civilian nuclear reactors or radioactive waste dumping, a number of state governors ventured farther. Mario Cuomo and Michael Dukakis actively opposed opening reactors that billions of dollars had already been poured into. In Colorado and Idaho, governors pressured the federal government to find other sites for nuclear waste.

Disputes that started in insulated forums made their way into the public domain. Feuding epidemiologists, conflicting krenlinologists, ebullient and doom-predicting economists, squabbling nutritional experts, warring weapons production experts, and frustrated SDI scientists, all took their case to the public, despite the clear understanding that it might undermine the general standing of their professions and programs. Flora Lewis summed up the SDI physicists' dilemma, pointing out that "they have been arguing inside the program for some time, to

58 *Ibid.* 59 *Ibid.*

60 *New York Times*, December 8, 1988, p. B18.

61 "Federal A-Plants Used Dumping Practices Banned for Others," *New York Times*, December 8, 1988, p. B18.

62 *New York Times*, November 23, 1988, p. 1.

no avail.... That is why their concerns are seeping into public print, despite the gag rule."⁶³

These disputes, combined with scandals that shook a number of the professions, and some spectacular failures – ranging from the *Challenger* disaster to the 1983 consensus forecast by economists that underestimated growth in the GNP by almost 100 percent – undermined the authority of experts.⁶⁴ The signs of this erosion in confidence were everywhere. In 1988 a governor's task force in New York agreed unanimously that physicians should be reexamined periodically as part of the state's licensing procedure.⁶⁵ Epidemiologists complained of the disastrous consequences that the "cry wolf" phenomenon might produce. Alvan Feinstein concluded his article with the warning that

epidemiologic studies of noninfectious disease have produced their own adverse side effect: an 'epidemic of apprehension.' The epidemic grows with each new alarm about a new menace in daily life. Uncertain about how to distinguish the many false alarms from the few that might be true, the public and nonepidemiologic scientists are confronted by evidence that is peer group-approved but scientifically inadequate.⁶⁶

Following the warnings about radon testing kits, there was a marked decline in test sales; in just one month consumers demanded 30,000 refunds. As the president of a leading test-kit maker told a *Times* reporter, "There has been a tremendous loss of public confidence."⁶⁷ A retired bank clerk in Mayfield, Ohio, who had used a test kit, read Public Citizen's warning, and demanded a refund, captured the public mood best: "I'm still very confused about it."⁶⁸

Analysts pointed to a decline in the public's faith in auditors, once thought of as the watchdogs capable of detecting fraud or anticipating a business's financial collapse.⁶⁹ Economists fared even more poorly in the 1980s. Once essential to policymakers and politicians alike, economists were shunned by the Reagan administration. Reagan even threatened to leave open the Council of Economic Advisers' chair.⁷⁰ Whereas most economists blamed anti-intellectualism, or political expediency, for their declining status, Sir Alec Cairncross, delivering the Richard T. Ely lecture to the American Economic Association in 1985, blamed economists themselves for giving conflicting and often wrong advice.⁷¹ Policymakers could

63 Flora Lewis, "A 'Star Wars' Cover-up," *New York Times*, December 3, 1985.

64 For a good summary of two major scandals that hit medical research in 1986, see Philip M. Boffey, "Major Study Points to Faulty Research at Two Universities," *New York Times*, April 22, 1986, p. C1. On economic forecasting, see Daniel S. Greenberg, "Alchemy," *Baltimore Sun*, January 13, 1988, p. A7.

65 *New York Times*, February 26, 1988, p. 1.

66 Feinstein, "Scientific Standards," pp. 1261–2.

67 *New York Times*, April 8, 1989. 68 *Ibid.*

69 *New York Times*, May 13, 1984.

70 *New York Times*, January 3, 1986, January 2, 1985, and September 27, 1987; *Wall Street Journal*, December 31, 1987, p. 1.

71 *New York Times*, January 2, 1985.

not trust economic theorists when theorists differed so widely, the distinguished British economist told his audience. Or, as the chief economist at Connecticut National Bank quipped, "What do you do? You've got 400 economists and 800 forecasts."⁷²

Nowhere was the precipitous decline in expert authority more wrenching than among the thousands of Americans employed in the production of nuclear weapons. A *New York Times* article headline, "Fear Corrodes Faith at Atomic Plants," captured the dramatic evolution. Nuclear workers had always shared a special spirit, dating back to the Manhattan Project. "Build your future with atomic energy," the workers remember being told in the 1950s, as Government contractors moved through the country on recruiting drives.⁷³ Many of the 600,000 men and women who signed on did just that, affixing the symbol of the atom to their high school buildings and naming their teams "the Bombers." A series of disclosures about past accidents and unsafe practices and the inconclusive debate currently raging between experts have left these men and women with a crisis of confidence. "How much don't they know about the risks of their jobs? Can they afford to trust the Government with their lives? What choice do they have? Those are the kinds of questions many of the workers have been exchanging more than ever in recent weeks," the *Times* reported. "The Department of Energy assures these workers that they are no less healthy than other industrial workers," but "many of the workers remember the inconclusive language of the epidemiologists, who speak in probabilities instead of certainties," the article concluded.⁷⁴

Experts themselves, though often oblivious to the longer-term cause, were among the first to recognize that their authority had declined. Some, including auditors, economists, physicians, and SDI project physicists, felt that the problem was simple: the public expected too much.⁷⁵ The solution lay in lowering these expectations. The American Medical Association (AMA), for instance, linked high patient expectations to soaring malpractice costs. It drew up plans to dampen "Marcus Welbyism" by holding seminars, distributing leaflets and sponsoring speeches in order to present a more realistic picture of the limitations of medicine.⁷⁶ What these earnest efforts to dampen expectations neglected was the source of those expectations. In the promissory state experts were called upon to create high expectations in order to create demand for their services sufficient to garner political resources – particularly funding and autonomy. The AMA official who complained that "we're too damned confident with our patients" was correct, as far as his analysis went. He failed to grasp, however, just how crucial that overconfidence was to the elaborate network of education, research, and applied technology that promissory state had carved out.

72 *Wall Street Journal*, December 31, 1987.

73 *New York Times*, December 11, 1988, p. 36. 74 *Ibid.*

75 On auditors, see *New York Times*, May 13, 1984; on economists, see *ibid.*, January 13, 1986; on physicians, see *ibid.*, February 10, 1985; on SDI physicists, see *ibid.*, December 16, 1985.

76 *Ibid.*, February 10, 1985.

Although some experts decided that the public's opinion of their profession was irrationally high, most analysts continued to worry about those "opponents" of science who harbored irrationally low opinions. A group of science journalists sitting around a table on public television discussing the American Association for the Advancement of Science meeting they had just attended in January 1989 captured the consensus of the science community best. Barbara Culliton, a noted commentator on science, discussed Stanford president Donald Kennedy's impassioned speech. Culliton informally labeled it "science under siege." Kennedy talked about critics ranging from animal rights activists to neighborhood groups who, from the scientists' point of view, were trying to impede research. He also noted "that the public no longer seems to trust scientists even though there is a high level of appreciation of what science can do." It was not their competence but their motives that were suspect. Kennedy suggested that the scientific community go on the warpath and start defending itself more aggressively.⁷⁷

Moderator Dave Marash intervened to elaborate on Culliton's point. "So it's really the same complaint that a lot of politicians are making, isn't it? That single issue constituencies are getting better and better at becoming roadblocks." Culliton confirmed Marash's hunch, but insisted that scientists were "probably less sophisticated than some other groups."

They want to speak to these activists rationally.... And the activists, the special interest, single issue groups in this field as in any other are less interested in a rational dialogue. And the scientists have not yet learned how to fight back in a political sense, so that irrespective of who ends up being right or wrong in any given case there's an unequal footing politically. And I think Don Kennedy is saying, you know, let's get our act together.⁷⁸

Before American promissory state try to get their act together in the 1990s they would do well to study the history of their past performance. My interpretation of their fifty-year run as the nation's most dynamic new political force suggests that they overcame their antiscientific, anti-intellectual opponents long ago. To continue to rail against this enemy is to misjudge their critics and underestimate the deep reservoir of support for science. Today's most effective opponents are far more likely to be colleagues, perhaps working for a different political jurisdiction, possibly in a different subdiscipline, almost certainly highly educated and undoubtedly skilled in the ways of issue network politics. In other words, the promissory state has triumphed.

The victory has not been systematic. In fact, promissory state who have learned how to adapt to the residue of a state once dominated by "courts and parties" in the late nineteenth century and the impulse to organize and coordinate characteristic of the 1920s and 1930s have fared the best. Victory has altered the

77 Transcript of *Science Journal* 2, no. 3, (January 19, 1989), Washington, D.C.: WETA, p. 8.

78 *Ibid.*

trajectory of American politics but has hardly eradicated previous patterns that remain deeply ingrained in the culture.

Once victory is acknowledged, the prominiestrative ensemble can perform its crucial second act. The script for that act has already been written by those who promised to employ expertise and administrative capacity to improve social conditions. For those who promised too much, the act will undoubtedly strain their audience's trust. But for other political actors, particularly those who read their reviews carefully and even solicit criticism at dress rehearsals, a promising career beckons.

Proministrators have not risen to such strategic positions of power in today's political system by eschewing politics. They should acknowledge the significant political agendas that they have always harbored. Only then can they begin to assess the long chain of reactions that has diminished their autonomy but made access to expertise a virtual precondition for effective politics. Although the final results of that chain reaction are far from predetermined, one lesson should be clear. The scope of debate, regardless of policy area, degree of insulation, or level of expertise, has been inexorably broadened. Although broader public participation can and has been in many instances consciously retarded, the absolute autonomy that may well remain the prominiestrative ideal cannot be sustained in America's pluralist landscape.

Rather than briefly postpone the inevitable, why not invite a full range of participation far earlier in the policy process, and certainly, long before implementation? Why not go still farther and test for demand rather than seek to create it artificially? No doubt these suggestions require a far longer attention span than most political actors are willing even to consider. But if the prominiestrative state cannot learn how to plan without excluding a broad cross section of political actors who ultimately will be involved in the implementation and consumption of services, can it master the increasingly complex programs it undoubtedly will seek to undertake? I think not. Should a few historically minded yet farseeing prominiestrators heed this advice, they may not only alter the subsequent chain of reactions, they may begin to harness it to achieve the social purposes that brought experts and administrators together in the first place.

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