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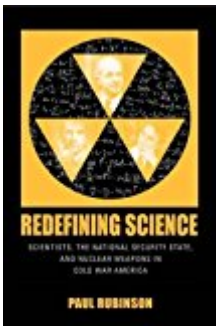

Paul Rubinson. *Redefining Science: Scientists, the National Security State, and Nuclear Weapons in Cold War America.* Culture, Politics, and the Cold War Series. Amherst: University of Massachusetts Press, 2017. 324 pp. $90.00, cloth, ISBN 978-1-62534-243-0.

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Paul Rubinson's book on the role of scientists in US nuclear weapons policy during the Cold War can be read on two levels. One is essentially biographical. In successive chapters it traces the positions taken by Linus Pauling, J. Robert Oppenheimer, Edward Teller (who haunts all the chapters), Herbert York, and Carl Sagan, as well as by the transnational Pugwash movement (that more or less peters out in the early 1970s) and religious or moral grassroots movements in the Ronald Reagan era. The other level at which one can read the book is methodological. I shall concentrate on the second for much of this review.

Rubinson's claim is that the national security state redefined science and "scientific" arguments to mean technical, objective, value-neutral inputs to the debate on nuclear weapons policy, distinguishing them from moral, activist critiques that were opposed to nuclear weapons and the arms race. This definition of the acceptable role of scientists was embedded in the Atomic Energy Commission's (AEC) decision to strip Oppenheimer of his security clearance, a decision that required science advisers to "uphold 'the protection of the strongest offensive military interests of the country.'" "This command," Rubinson writes, "reset the terms in which scientific advice about nuclear weapons would be judged limiting advisers to technical advice, rather than moral and political considerations" (p. 6). The Cold War redefined science as "neutral, emotionless, and apolitical" (p. 73). Scientists, "conservative in nature," amplified this by "assimilating the government's conception of the proper role of scientists and seeing ***objectivity*** as synonymous with ***apolitical***" (p. 8). Teller went further, helping to "enforce the redefinition of science" "by framing the nuclear issue around the concepts of both loyalty and technical expertise" (p. 63). The ensuing limitation of scientists' social role by "the government's suppression of scientists' moral arguments against nuclear weapons had great consequences for science, society, and the nation." It led science, and physics in particular, to become "dependent on the economic, political and militaristic elements of U.S. society." The scientific community cooperated in the

militarization of their discipline that followed on massive financial support from the Department of Defense throughout the Cold War. No longer free to actively oppose the nuclear weapons system on moral grounds, "dissent disappeared, and science became subordinate to political beliefs in public policy debates" (p. 245).

Rubinson effectively shows that scientific advice was formally limited to technical advice at the highest levels of the government. However, this limitation was not imposed by the national security state, as he seems to think. It was part of the

deal brokered by scientists with the government —after all, it was not evident that they should be granted access to the presidential ear. In his farewell address in 1961, Dwight Eisenhower famously warned against "the danger that public policy could itself become the captive of a scientific-technological elite," admitting afterward that he specifically had Teller in mind (p. 105). [1] Scientific advisers had to be on tap but not on top. In fact, scientists themselves recognized that their social authority as *scientists*, and their case for having a special role to play in nuclear policy-making, relied precisely on their privileged technical insights. Correlatively, if they deviated from such inputs, their credibility was impugned. Their task was to judge the technical feasibility of policy options, especially regarding arms control measures, without allowing explicit moral or political concerns to define their positions.

Scientific advisers often disagreed sharply with each other, as Rubinson shows, much to the frustration of presidents who naively looked to experts to come up with unambiguous answers to technical questions. The uncertainty and lack of consensus that characterizes science at the research frontier is endemic to weapons policy. Sometimes definitive evidence required many years of systematic research (as with Pauling's claims that US bomb tests "will in the course of generations cause the birth of 80,000 children with gross physical or mental defects") (p. 42). Sometimes only a nuclear war itself could resolve uncertainty. Sagan, who predicted that the cloud of dust and debris produced by a global nuclear conflagration would produce a "nuclear winter" on earth, admitted that his hypothesis was "not amenable to experimental verification—at least not more than once" (p. 199), by which time most of us would be dead. Testing a hypothesis might involve technologically simulating a warlike scenario. The first director of the Lawrence Livermore Laboratory, York, was among those who argued against Teller's promotion of an Antiballistic Missile Weapons System (ABM) on technical grounds. York and his colleagues had "grave doubts whether an ABM System would work as planned" because of the ease of penetrating it, or of confusing its detectors with decoys (p. 159). Their doubts could only be confirmed by actually putting an ABM system in place, and demonstrating that it did not work as envisaged. Even then, as one leading scientist remarked, Teller and his supporters "would find a technical way to circumvent or discredit" any policy option they were opposed to (p. 102). In short, restricting scientific advice to technical advice imposed severe limits on the impact technical arguments could have on weapons policy, leaving room for moral and political arguments to hold sway—arguments that scientific advisers could not make *as scientists.* Their advice had to be objective, value-neutral, and apolitical. Their moral objections were no ground for dissent.

The "identity" of scientific advisers was not "redefined" by the national security state, as Rubinson asserts. A science/non-science distinction that maps onto objective/subjective, value-free/value-laden, detached/emotive was one of the core features of the ideology of science during the Cold War. The advising role allowed to scientists traded on an ethos that was embedded in the community's sense of itself. It was deployed to do the boundary work needed to limit the influence of the "scientific-technological elite" in a demo-

cratic society. It was also used within the community to discredit opponents. Teller invoked it repeatedly to great advantage, for example, by accusing York's arguments against an ABM system as being both fallacious ***and*** political, so lacking in objectivity. John Maddox, the editor of the prestigious journal ***Nature***, used it to discredit Sagan's anti-nuclear campaign in the popular press.

Rubinson's suggestion that "the government" forced scientists to sideline moral concerns idealizes nuclear physicists. Implicitly he sees them as being particularly virtuous, and so obliged to refashion their identities, suppressing their ethical values if they wanted to participate in the advisory machinery of government. This perception of the scientific community as beacons of virtue is at variance with all that we know about the postwar contract between science and the state. Physicists ***did*** refashion their identities immediately after the war. Most significantly, the majority adjusted to working under a regime of secrecy in peacetime, in return for lavish funding from the Department of Defense and the AEC.[2] This paid for increasingly expensive research equipment, provided job security, and facilitated access to the corridors of power for the elite. Joseph Rotblat, the only scientist who left the Manhattan Project for moral reasons when Germany surrendered, remarked afterward that the majority of his scientific colleagues in the A-bomb project "were not worried by moral scruples" (p. 18).[3] For them, Hiroshima was a laboratory in which to test their brilliant theoretical and experimental research and the resulting "gadget." Their immediate reaction when the bomb was dropped was "It worked!" Some of those who had second thoughts after the event, like Robert Wilson, vowed never to do weapons work again and built US strength in postwar high-energy physics by directing Fermilab, near Chicago. Some, like Hans Bethe, were plagued by doubt for the rest of their lives. Others like Teller and John Wheeler continued to work enthusiastically for the Department of Defense. If any value drove them, and indeed the majority of the postwar weaponeers, it was a patriotic determination to defend their country and the values it stood for from the Communist threat. Rubinson blames the government for their moral turpitude. They were no more or less moral than the average citizen: indeed, as David Kaiser writes, most physicists who came of age in the 1950s were more like the pragmatic, suburbanized "organization men" analyzed by American sociologists at the time than outspoken critics of their government's weapons policies.[4]

The physicists who were particularly engaged in defining arms policy—York and Teller—were deeply involved at one time or other in their lives in developing new weapons. Their opponents described in the book were neither government advisers nor weapons scientists. Pauling and Sagan were respectively a chemist and an astronomer. Helen Caldicott of the Physicians for Social Responsibility and Rotblat, a force in the Pugwash movement who studied the genetic effects of radioactive fallout, were not nuclear physicists engaged in weapons work after World War II. There was a price to pay for state patronage and a passion for doing cutting-edge weapons-related research in an ideological climate that promoted moral conformity: the "amoral" scientist was coproduced by the state and her/his professional community to ensure permanent preparedness for war.

This is not a book about the national security state in Cold War America redefining scientists' identity by restricting them to giving technical inputs to the policymaking process. It is a book about the limitations on the kinds of disagreement that occurred between scientific advisers who had access to the highest echelons of the policymaking process, the strategies that they invoked to discredit their opponents, and the quite different kinds of critiques made mostly by non-physicists to American weapons policy in the Cold War. Scientists and engineers have a limited capacity to criticize policies for using the lethal instruments

of war that they put into the hands of their patrons. This is why informed "outsiders" are essential to the governance of science in contemporary society. They are free to bring different considerations—environmental, ethical, cultural, and political—to bear on policy choices. Eisenhower emphasized in his farewell address that "only an alert and knowledgeable citizenry can compel the proper meshing of the huge industrial and military machinery of defense with our peaceful methods and goals, so that security and liberty may prosper together."[5] It is a warning that remains even more pertinent today than it was over fifty years ago.

Notes

[1]. "Eisenhower's Farewell Address to the Nation," January 17, 1961, http://mcadams.posc.mu.edu/ike.htm.

[2]. David Kaiser, "The Postwar Suburbanization of American Physics," ***American Quarterly*** 56, no. 4 (2004): 851-888.

[3]. Joseph Rotblat, "Leaving the Bomb Project," ***Bulletin of the Atomic Scientists*** 61, no. 50 (2005): 16-19.

[4]. Kaiser, "Postwar Suburbanization of American Physics," 858-859.

[5]. "Eisenhower's Farewell Address to the Nation."

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