A part of but apart from politics

Can scientists advise policy-makers without compromising their objectivity?

Nature's Experts: Science, Politics, and the Environment
by Stephen Bocking
Rutgers University Press: 2004. 304 pp. $60, £44.50 (hbk); $24.95, £17.50 (pbk)

Roger Pielke Jr

RON EDMONDS/AP

Valentine's message: passions can run high when scientists get involved in the political process.

In this excellent book on environmental science and politics, Stephen Bocking grapples with a problem that he characterizes as a riddle: "How can science be part of the political process yet separate?" Or more specifically: "How can we ensure that scientific research provides the information we need to pursue our environmental values and priorities (whether these relate to exploitation or to protection) without science itself becoming subject to the conflicts and controversies of environmental politics?"

For decades, the riddle posed by Bocking was answered through a widely shared conceptual model about the role of science in society, presented most influentially in Vannevar Bush's 1945 report to government, *Science: The Endless Frontier*. The policy advocated by Bush depended on a distinction between basic and applied research, with basic research contributing to a reservoir of knowledge that could be tapped to solve problems and exploit opportunities. Basic research was characterized simply as the quest for knowledge; it was pure. The elegance of the plan is that basic research was also fundamental to societal progress, and hence was part of the political process. Science was both separate from, and yet a part of, politics and decision making. This blueprint created momentum that was ultimately expressed in the creation of the US National Science Foundation. But the Bush report is remembered chiefly for its expression of the axiology and culture of science — it proposed that science should be led by scientists, not politicians — rather than for its ideas for creating institutions.

Bush's science policy has always had its critics, but only in the past decade or so have their criticisms been accompanied by shifts in science policy. Scholars of science and politics have begun to characterize conceptual models for science policy that move away from his model. An example is provided by Helga Nowotny, chairwoman of the European Research Advisory Board of the European Commission, and her colleagues. She says the old paradigm of scientific discovery "characterized by the hegemony of disciplinary science, with its strong sense of an internal hierarchy between the disciplines and driven by the autonomy of scientists and their host institutions, the universities" is being superseded, but not replaced, by a new paradigm of knowledge production. The new paradigm is "socially distributed, application-oriented, trans-disciplinary and subject to multiple accountabilities".

Another characterization of the move away from the old Bush model is the late Princeton historian Donald Stokes's 1997 model *Pasteur's Quadrant*, which reflects "use-inspired basic research" — a concept that is oxymoronic in the context of the Bush model. This sort of thinking has led, for example, to the adoption of the National Science Foundation's second review criterion, which focuses the evaluation of research proposals on societal impacts of research, and to ever more attention to scientific assessments and advisory bodies as important institutions in the policy process.

Scholars of science, technology and society have developed a robust body of knowledge that shows the flaws in the Bush science policy, and some parts of the community have experimented with alternatives. Even so, the Bush model is still widely embraced by many scientists and policy-makers. For instance, in 2004 the US National Research Council issued a report on scientific advisory committees, recommending that political considerations should not play a role in the process of deciding whom to appoint to policy panels. Yet its own membership, drawn from former government officials appointed by past presidents, reflected a perfect political balance of those appointed by Republicans and those appointed by Democrats. Similarly, the Intergovernmental Panel on Climate Change has the temerity to claim that it is "policy neutral", yet its website trumpets its success in advocating the adoption of the Kyoto Protocol to the Framework Convention on Climate Change. As science policy has changed, these actions show signs of schizoid behaviour — the result of efforts to keep science both part of and separate from politics at a time of fundamental change in science policy.

In the context of this change in the role of science in society, Bocking clearly explains that the authority of science is ephemeral. He quotes Dorothy Nelkin: "As scientists debate the various sides of politicized issues, their involvement undermines assumptions about the objectivity of science, and these are precisely the assumptions that have given experts their power as the neutral arbiter of truth." By participating in political debates as advocates for special interests, scientists are reducing their claim to authority. Science becomes "politics by other means".

Two accessible chapters provide an overview of literature from the fields of science and technology studies, and policy. They cogently present many of the complexities and contradictions of science in policy and politics. Bocking presents well-informed discussions of three cases: natural resources management, global environmental change, and chemicals in the environment. Each chapter is well written and argued but is chock full of detail and allusion that may make them most meaningful to those

already familiar with each case.

Concepts such as 'credibility', 'influence' and 'deliberative democracy' are the focus of the book's closing chapters. Although they are important concepts, these chapters would have been more valuable if they had been discussed with the same analytical breadth and empirical depth of the book's first six chapters. But the same critique can be made of much of the literature on science and society: strong on diagnosis, less strong on prescription. It shows that scholars of science, policy and politics are just like the experts they study — they have more work to do in practising what they have learned about knowledge and action in the changing context of science policy.

Overall, this is an excellent book, worth reading by anyone interested in science, politics and the environment. But it is likely to be of particular value to environmental scientists who want to understand how and why the role of science in society is changing. ■

Roger Pielke Jr is at the Center for Science and Technology Policy Research, University of Colorado, Boulder, Colorado 80309-0488, USA.

Marketing Marie

Obsessive Genius: The Inner World of Marie Curie
by Barbara Goldsmith
Weidenfeld & Nicolson/W. W. Norton: 2004. 320 pp. £14.99/$23.95

Susan Lindee

THE ART ARCHIVE/CULVER PICTURES

More than a woman: Marie Curie believed she had overcome the physical constraints of the body.

The life of Marie Curie was better than fiction. She was brilliant, driven and difficult; a scientist of the first rank; a mother; a young widow; a scorned woman in love with a married man; and a shrewd marketer of both herself and her discoveries. She won two Nobel prizes — for her work on radioactivity and the discovery of radium and polonium. She died aged 67 as a result of her cavalier approach to laboratory exposure to radioactive materials. Her appearance was also striking, both as a pale, beautiful young woman and as a stern, intense matriarch.

It is perhaps unsurprising that her life story has been told and retold in hundreds of biographies since her death in 1934. Beginning with her daughter Eve's affecting 1937 study, biographers have sought to illuminate her tragedies, intellectual style, determination and achievements, in studies aimed at scientists, children and the general public, published in English, French and many other languages. The flood shows no signs of abating: since 1995 there have been 36 English-language biographies entitled, roughly, *Marie Curie*. These include Susan Quinn's *Marie Curie: A Life* (Simon & Schuster, 1995), a fast-paced and well documented portrait of the Curies and their world, and *Marie Curie: A Biography* by historian of science Marilyn Bailey Ogilvie (Greenwood, 2004).

It would be reasonable to wonder why anyone would want to write another biography of Marie Curie. Her personal papers, still somewhat radioactive, have been accessible to researchers for more than a decade, and the details of her life have been well known in outline for 60 years. What more could there possibly be to say?

Yet I must acknowledge that Barbara Goldsmith has managed to say some interesting things, and they are not the result of intense data-mining. Rather, she contributes a slow, methodical curiosity about matters that other authors have brushed past.

Goldsmith turns her attention to Curie's shifting ways of writing about her husband Pierre in the diary written after he was killed in a traffic accident, and to the mixed messages in Pierre and Marie's discussions of the commercial applications of their work. She addresses Marie's decision to involve her 17-year-old daughter Irene in the dangerous and gruesome war work of X-raying stricken soldiers, and she ponders Eve's estrangement from her mother. The Curies' interest in spiritualism, their attendance at séances and their involvement with the Society for Psychical Research are explored in the context of Marie's reactions to Pierre's death. The public scandal over her affair with the physicist Paul Langevin is considered primarily in terms of its depressive effect on Marie, rather than in sociological terms, which could illuminate gender relations in early twentieth-century France. Goldsmith then considers the Curies' incautious handling of radium, which she attributes to their love of their own discovery. A final chapter outlines the family's enduring legacy and continuing scientific achievement. In all these discussions, Goldsmith makes good on her promise to excavate an "inner world".

As Goldsmith acknowledges, Marie Curie invented her own life story in the 'autobiographical notes' that accompanied her 1929 study of Pierre after his death. That life story, which has shaped virtually every biography of her since, emphasized the irrelevance of the physical body to scientific work. She described her paltry diet, her cold garret room and her poverty, using such details to highlight the legitimacy of her apprenticeship to science. Curie said she was strong enough to overcome the constraints of the