

# Ivory Bridges: Connecting Science and Society

By Gerhard Sonnert and Gerald Holton. MIT Press, 2002. 225 pages. \$30.00. ISBN: 0262194716

Despite the fact that science has had a significant impact on society there is a strong public perception that scientists do not really care about the affairs of society, and are content to merely conduct solitary research in socially isolated universities. In *Ivory Bridges: Connecting Science and Society*, Gerhard Sonnert and Gerald Holton attempt to dispel that perception and provide an analysis of the many ways in which scientists interact with society through the government and interest groups. They also describe the tension between the conflicting perceptions of the proper role of scientists. On the one hand, there is the view, based on what they call the Newtonian model, that scientists should conduct research solely out of curiosity, with little concern for practical applications. On the other hand is the view, based on what they call the Baconian model, that scientists should only work on questions that have social applications. They try to resolve this tension by promoting what they call the Jeffersonian model of science, in which scientists seek to discover the truth about areas that are of fundamental importance to society without seeking specific goals. In their opinion, the Jeffersonian model offers the proper balance between curiosity-driven research and applied research. It prevents scientists from doing work that is too focused on specific problems, which may ultimately vanish over time. It also prevents scientists from working on issues that are currently socially irrelevant but which may produce relevant results in the future.

Although this is a short book, the authors provide rich data to back up their argument that the Jeffersonian model is ideal for connecting science and society. Gerhard Sonnert is a former sociologist of science and Gerald Holton is a physicist and historian of science, and both are members of the Department of Physics at Harvard University. They devote the first chapter of the book to elucidating the Jeffersonian model vis-à-vis the Newtonian and Baconian models. The second chapter analyzes how scientists interact with society through the government as scientist-administrators. The third chapter analyzes how scientists start their own advocacy groups, based on their notion of personal responsibility for the scientific advances they have enabled. Finally, the Appendix provides the reader with a comprehensive list of different scientist advocacy groups with a variety of missions.

The second and third chapters are critical because they depict how scientists have interacted with the government to develop science policy, and have created advocacy groups to promote awareness about scientific research. Sonnert and Holton note that scientist-admin-

istrators tend to be in a precarious position because their government advisory roles may lead to conflict between their own scientific judgment and the dictates of elected officials. There is also tension among scientists themselves: some perceive the political process of developing science policy as contrary to the research process of the scientific endeavor – the latter is devoted to truth, the former to power – and thus no place for a true scientist; others believe that the political process is the best way to connect science with society, regardless of who is in power at any given time, and that advocacy groups are the best way to interact with the political process.

The second chapter is devoted to describing how the government policy process has been more-or-less favorable to scientist-administrators: unfavorable during the Nixon administration, favorable during the Carter administration. This is exemplified by the efforts of science advisors in the Carter administration to apply the Jeffersonian model by making all government departments and agencies define the basic research that would directly contribute to the long-term achievement of their objectives.

The third chapter explains how different advocacy groups can have different levels of political and social impact based on the nature of the group. Some groups are moderate, and thus have a great deal of impact on society, as evidenced by Nobel Peace Prizes, while more radical groups have little impact because they want to use their group to change society as a whole instead of merely affecting science policy.

The authors also note that, in terms of their percentage among all scientists, those who join advocacy groups or work on science policy for the government are relatively few, but that those who do engage in advocacy and policy development tend to join many different groups and interact with the government in a variety of ways. Hence, the few scientists who do interact with society end up taking on a greater role as advocates who happen to have a background in science. They spend a great deal more energy starting groups and coordinating them, compared to the time they spend in the laboratory. The authors explain the relative deficiency scientists interacting with society by arguing that the scientific culture does not provide incentives to become involved in social issues. On the one hand, there is greater demand placed on research and publication. On the other hand, scientists tend not to care whether their colleagues are involved in social issues in any way. Thus, instead of scientists interacting with society in a steady stream, the authors note that most scientists start interacting with

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society in waves, based on contemporary social issues.

Accordingly, Sonnert and Holton identify three main waves of scientists interacting with society through voluntary public interest groups. The first wave was in the 1940s, immediately following the end of World War II, when the scientists who had worked on the Manhattan Project developed several campaigns and movements to restrict the development of nuclear weapons. This was done as a self-accepted duty to society to help manage nuclear weapons, mainly because they were the only knowledgeable source for the science behind the atomic bomb. They were successful in helping to set up the Atomic Energy Commission and the different policies that restricted the spread of nuclear weapons. The second wave occurred in the 1960s and 1970s when concern about the environment began to grow. These scientists helped to establish the Environmental Protection Agency. Finally, the third wave began in the 1980s when scientists became concerned about the potential applications of modern genetics.

The authors note that the major difficulty scientists encounter when they interact with society is the tension related to their claim on authority. On the one hand, scientists are perceived as inherently authoritative if they have unique knowledge about a specific issue. For instance, when scientists started lobbying the government about the restriction of nuclear weapons, the policy-makers took their concerns seriously because no other interest group had their specialized knowledge. Conversely, when specific scientific knowledge is in dispute, such as global warming, scientists struggle to

establish authority because the general public tends to see the specific scientific knowledge as biased toward a particular scientist's beliefs. Thus, some scientific groups advocate government policy to help mitigate global warming, while other groups advocate no government policy because they think that global warming does not exist.

The strength of *Ivory Bridges* is the comprehensive survey of the role of scientists as advisors and activists in the United States since 1945, as well as providing an excellent supporting bibliography and background material. However, the book is somewhat limited in its analysis because it neglects the complementarities between basic research and its applications, in which practitioners consciously benefit from and actively support the public funding of long-term research. The book also does not systematically examine the relationships between government-funded basic research and its applications to health, weapons, and the economy. Although this is discussed briefly with regard to the efforts of Vannevar Bush to establish government-funded research after World War II, the authors do not examine its present incarnation. Such an analysis would show that the United States governmental health and military planners do indeed have a deep concern for basic research and that scientists have taken a greater role in private firms developing bio- and information technology.

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