Expanding the Rationale for Analysis and Deliberation: Looking Beyond *Understanding Risk*

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Carolyn Raffensperger argues for an alternative role for scientists in risk-related policies other than that of "expert" and also for an expanded view of "good" science. She advocates the use of additional tools to risk characterization and portrays the ideal relationship between scientists and various publics in the image of a round table in which the main dish is not risk characterization but a stone soup to which all contribute. These are arguments and images which I strongly support; indeed, they are supported by a convergence of several schools of thought. In my view, however, the discussion draws on a limited body of this relevant literature. In the following pages, I outline several areas in which the author's argument could be strengthened and I suggest a particular focus for the prospectus for Volume Two of the National Research Council's (NRC) publication, *Understanding Risk*.

First, criticism of risk assessment is not confined to that of the environmental community and to those who criticize the technocratic, exclusionary nature of risk assessments. An additional critique has arisen, primarily from cultural theorists and sociologists in the field of science and technology studies, that focuses on the social institutions and the social and cultural context in which risk is assessed and managed. These scholars have emphasized that *all* knowledge, including that of the scientist, is socially constructed — that the creation of knowledge is a human endeavor that occurs within, and not outside of, society. Thus, science and scientists, as well as lay persons, are subject to social processes; they conduct science and interpret risk through the filter of values and social organization (e.g., Cetina 1995; Jasanoff 1987; Jasanoff, Markle, Peterson, and Pinch 1995; Rayner 1984; Schwartz and Thompson 1992). Wynne, also, has been a foremost contributor to the risk literature, in emphasizing that the key uncertainties in risk-related problems stem not simply from technical uncertainties in risk assessment but also from uncertainties about institutional dimensions such as the competence, trustworthiness, and independence of the societal institutions and their ability to manage risk in a way that preserves safety and other valued aspects of life (Wynne 1980; 1992; 1996). The need for negotiation among "alternative cultural perspectives" follows automatically from this view of risk (Rayner 1984, 160).

Second, as the case studies summarized in the Appendix to the NRC report demonstrate, the critique of risk assessment frequently serves as a surrogate for more deep-seated social concerns. (Significantly, also, the NRC case studies encompass more than risk characterization.) A particular critique, from the philosophy of science perspective, extends to the broader issue of the relationship between science and democratic institutions. Drawing on the work of Habermas (1975; see also, McCarthy 1988), critical theorists have developed an extensive critique of the institutional structures that have created and maintain systems of domination and quiescence and have emphasized the role played by science and technology in furthering the dispowerment and alienation of citizens. Writers from this school criticize the overreliance of modern society on the instrumental rationality of science and technology and the associated devaluation of other forms of knowing such as intuition and understanding. As reliance on scientific expertise increases, ordinary citizens are shut out of a broader discussion of means and ends: alternative ways of knowing and the value placed on human values such as creativity and friendship are ignored. Instrumental and strategic thinking distorts our understanding of what it means to be human and has displaced the broader, Aristotelian concept of practical reason as a means for achieving the good, moral life by a very narrow concept of objective scientific reason as an instrument for achieving specific ends. Critical theorists advocate communicative rationality in place of instrumental rationality — a reflective, participatory approach in which communication among scientists and the public is guided by four standards (comprehensibility, sincerity, ethics/legitimacy, and truthfulness).

Third, I would submit that, although welcome, the NRC report can hardly be characterized as making a "radical" contribution. Indeed, I would criticize the NRC for failing to recognize and incorporate at an earlier date the intellectual developments of the 1970s and 1980s in relation to science, technology, and risk. More than twenty years ago, the Office of Technology Assessment (OTA) questioned whether a new kind of assessment was needed that "looks at a human value system and how it impacts technology, rather than starts with technology" (OTA 1976, 203). Despite the work cited above, that expanded on this recommended OTA starting point, the NRC continued to endorse a two-step approach to risk that separated the facts of analysis from the social process of evaluation and encouraged a linear approach to communication (NRC 1989; for a critique, see Bradbury 1994; Rayner 1984; 1987).

Fourth, while justly criticizing the NRC report for not fully elaborating on *how* an analytic-deliberative process involving citizens and scientists makes better science, the author's own elaboration is limited. No reference is made to the long list of contributors to the growing awareness of the limitations of science in resolving complex policy problems without extensive communication among experts, government officials and the range of publics affected by policy (see, for example, Dryzek 1990; Robinson 1992). With the exception of the reference to Tennant's experiment (which examined results obtained by different groups of experts as opposed to results obtained among experts, officials, and various publics), the cited examples tend to be assertions rather than explanations of why better science may occur.

In my view, one of the most pertinent examples of how interaction between expert and laypersons leads to better science is provided by Wynne (1996). In the case cited by Wynne, British technical experts based their predictions of short term impacts of radioactive fallout on grazing land used by local sheep farmers following the Chernobyl accident on an assumption that the soil embodied the properties of alkaline clay. In reality, as the sheep farmers knew, local soils were primarily acid peaty soils that had a very different uptake of radiocesium than that of clay. The government policy that was adopted on the basis of the experts' predictions without benefit of local knowledge was disastrous for the sheep farmers. Wynne's analysis highlights the need for experts to be alert to the conditional nature of their knowledge, i.e., to consider whether assumptions embedded in their approach seem valid to the public who will be affected by a proposed policy. In this case, local and expert knowledge were complementary and both were essential to "good" science. Moreover, as Wynne concluded, political institutions that base their policy decisions on assumptions about human behavior that seem irrelevant to, or at odds with, the public's experiences of itself and the world, risk eroding the very legitimacy on which they rely to implement their policies.

Raffensperger's proposal for a Volume Two of *Understanding Risk* is sound. In particular, I believe that a more in-depth evaluation is needed of examples of scientists, government officials, and various publics as co-learners in addressing policies that incorporate scientific uncertainty and risk. The examples provided in the NRC report are not (nor were they intended to be) analytic in nature and, as such, have limited value as models to adopt. What factors contribute to an effective discourse? How transferable are the lessons from one context to another? Are there situations where structural constraints reduce the likelihood of an effective discourse? Currently, there is little in the published literature that fills this needed gap. One notable exception is Renn, Webler, and Wiedemann's book, *Fairness and Competence in Citizen Participation*, which examines a variety of models for environmental discourse and includes a valuable chapter by Webler that lays out a procedural, normative model for evaluating such discourse (Renn et al. 1995). Also, in progress, is the work being conducted by myself and colleagues at Pacific Northwest National Laboratory that builds on Webler's approach in evaluating the discourse among scientists, government officials, and citizens in the 12 citizen advisory boards that have been established by the Department of Energy at radioactive cleanup sites around the nation. Much more is needed, however, before we can state with certainty that such co-production of knowledge leads both to better science and better policy.

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