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Commentary

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Recent controversies and forms of engagement between science and publics cannot be understood in the narrow technical terms of 'risk' and disputes about it. Even when it is acknowledged that uncertainty, rather than risk in terms of calculable probabilities, pervades scientific issues, they frequently remain cast in these same narrow technical terms. The chapters in this section argue for, and show, a variety of ways of moving beyond these narrow definitions of scientific issues, and the notions of citizenship they embody, to encompass more of the dimensions of human meaning and concern which are found to pervade encounters between science and publics in all parts of the world.

Thus Jerry Ravetz argues for a shift from 'risk' to 'safety'. This extends his earlier notion of post-normal science, characterized by complex problems, uncertainties and strong value commitments, and requiring an extended peer community and mutual learning through dialogue. He argues that concerns with safety increasingly animate encounters between science and society, safety being a more vernacular, qualitative concept which embodies political, moral and relational concerns as well as technical ones. In Ravetz's view, safety is a constitutional issue in terms of the responsibilities of the state, of the same order as freedom of speech or human rights. This embodies a notion of citizenship as linked to claims to safety, in relation to a state.

Whether safety is the appropriate term for seeking this move beyond risk was widely debated in the meetings that have informed this book; however, the chapter does underline the basic point that politics and science must be seen together. Equally, other chapters in this book would question the degree to which the state can act as the primary guarantor of safety in relation to science, in the context of rapid processes of privatization and globalization.

If Ravetz has introduced an argument for the politicization of science and science–society encounters, Fischer explores further the epistemological relations between scientific and public rationalities. He contrasts the technical rationalities that tend to frame public policy debates about science and technology, often defining these in terms of risk, with the

sociocultural rationalities of publics. These emerge from lived experience as embedded in people's social worlds, and are guided by a logic of practical reason which integrates the social and the technical, and relates judgement on any issue to its relations with 'the good way of life'. These dimensions are systematically ignored by technical risk discourses which Fischer thus argues are 'irrational'.

Fischer's reference to 'the good way of life' as a basis for epistemology is taken further by Wynne in his critique of risk as the assumed framework of meaning imposed on public issues involving science. The essence of Wynne's argument is that people's sociocultural rationalities are about more than epistemology – knowledge or ways of thinking; they are about ontologies, or ways of being. At the same time, representations of risk, while imposing presumptive meanings that obscure and disable people's ontologies, also impose their own: they actually project implicit models of the human, and in that sense are tacitly performative of human ontologies. This has important implications for citizenship: while citizenship practices may emerge from people's own ways of being, particular constructions of the citizen are also imposed through risk discourses whose influence reflects real relations of power in national and, increasingly, international contexts.

A further aspect of breaking free of the risk discourse straitjacket which Wynne underlines is the need to problematize as part of the citizenship agenda the front-end purposes of innovation, and the human purposes driving this. Wynne draws examples from the large anthropological literature which has documented more 'autonomous' processes of creativity in local cultural settings to illustrate how innovation can be driven by diverse human meanings and purposes. As he notes, however, with globalization the sources of innovation and forms of agency constructing and driving innovation are increasingly distanced and obscured from those expected to make use of it.

These themes are picked up by Shiv Visvanathan, who argues that we need to go beyond the normal rhetoric of participation to an understanding of the democratic implications of cognitive representation and empowerment. This can be seen in terms of popular struggles for cognitive justice. This is not to fall into the trap of an anti-science and technology discourse, but to recognize the plurality of knowledge systems, and the underlying relationships between knowledge, livelihoods and ways of being. He argues for the recognition of the rights of alternative epistemologies and sciences in a more democratic imagination of science and citizenship.