HAL
open science

Experts on public trial: on democratizing expertise through a Danish consensus conference

Anders Blok

To cite this version:

Anders Blok. Experts on public trial: on democratizing expertise through a Danish consensus conference. Public Understanding of Science, 2007, 16 (2), pp.163-182. 10.1177/0963662507062469 . hal-00571128

HAL Id: hal-00571128

https://hal.science/hal-00571128v1

Submitted on 1 Mar 2011

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Public Understand. Sci. **16** (2007) 163–182

Experts on public trial: on democratizing expertise through a Danish consensus conference

Anders Blok

Citizen deliberation on technoscientific developments is regularly regarded as a hallmark of Danish democracy, embodied in particular by the Danish Board of Technology. Few empirically guided questions have been raised, however, as to how the Board's democratic projects actually work. Through a case study of the May 2003 Danish consensus conference on environmental economics as a policy tool, the article reflects on the politics of expert authority permeating practices of public participation. Adopting concepts from the sociology of scientific knowledge (SSK), the conference is seen as opening up the "black box" of environmental economics, forcing economists into attempted justifications of their shared normative and methodological commitments. The failure of environmental economists to reflect on their social value positions is suggested as key to understanding their less-than-successful defense in the citizen perspective. Further, consensus conferences are viewed alternatively as "expert dissent conferences," serving to disclose a multiplicity of expert commitments. From this perspective, some challenges for democratizing expertise through future exercises in public participation are suggested.

1. Introduction: democratizing expertise?

Under the label of "knowledge society," notions of the autonomy of science and its strict separation from political life have come under increasing attack. Contemporary approaches in sociopolitical analysis have suggested the need for seriously rethinking the "social contract" between science and society (Gibbons et al., 1994; Latour, 2004; Elam and Bertilsson, 2002). As a reaction against the long-term tendency towards a scientization of politics, with growing technical complexity increasing the reliance of governmental activities on various forms of expert advice, calls are now being made for a democratization of expertise (Funtowicz and Ravetz, 1992; Brown et al., 2004). Inspired by deep disagreements between experts and lay people on issues such as biotechnology and genetic testing, these calls are starting to impact on policy discussions. In the British context, the House of Lords in 2000 asked for enhanced public engagement in scientific affairs, and the European Commission committed itself in 2001 to "sustained dialogue between experts, public and policy makers" (Irwin and Michael, 2003: 56–62; European Commission, 2001). Concomitantly, growing international attention is directed towards Scandinavian experiences in setting up open, inclusive science and technology policy cultures. In particular, techniques of citizen–expert dialogue such as consensus

© SAGE Publications ISSN 0963-6625 DOI: 10.1177/0963662507062469

conferences, pioneered by the Danish Board of Technology (DBT), are viewed as positive contributions to an evolving scientific democracy.

In this article, I use a case study method to reflect upon questions surrounding the prospects and limitations for democratizing expertise within the public deliberative forum of a consensus conference. As pointed out recently by Carolan (2005), little is still known about this democratization process itself. While consensus conferences and similar practical models of deliberative democracy have received widespread academic attention, few attempts have thus far been made to study such participatory projects empirically from this perspective (Pellizzoni, 2001; Bruun Jensen, 2005).[1] Rather than citizen participation as such, my approach focuses on the dynamics of expertise and the politics of expert authority permeating deliberative forums. The specific case under study is a four-day conference organized by the DBT in May 2003 on the theme of environmental economics as a policy tool. I argue that this event embodies a potentially far-reaching conception of democratizing relations between science, policy and the public. It invited lay people to exercise their "scientific citizenship" (Irwin, 2001) by opening the "black box" of environmental economics (cf. Yonay, 1998). Conversely, it required for environmental economists to attempt to explain and justify their shared commitments to a lay audience. The overall question is how this experiment in democratizing environmental economic expertise played out in practice.

Needless to say, environmental economics is the subject of heated academic and political controversies, in Denmark as elsewhere (Grove-White, 1997; Corry, 2003). In particular, as noted by Dryzek (1997: 72), views on environmental cost–benefit analysis differ dramatically, ranging from economists propagating it as rational decision-making to philosophers' and environmentalists' perceived defense of nature, altruism and morality.[2] Indeed, environmental economics might be seen as a frontier where competing worldviews, or "nature-cultures," clash, leading to intractable controversies without agreement on either facts or principles (Latour, 2004; Siu, 2002). In such situations, deliberation becomes difficult, as conflicting parties speak different and seemingly incommensurable languages (Pellizzoni, 2001: 69–72). Attempts at democratizing expertise through consensus conferences are likely to involve polarizing tendencies. However, as will be argued in this article, in situations characterized by technoscientific "black-boxing," democratization is linked to the questioning of dominant scientific assumptions and justifications (Goven, 2003). Environmental economics is a black box of hidden assumptions, values and justifications. Opening the box requires counter-experts, making questions of selecting, framing, enhancing and contesting expertise essential for the democratic virtue of consensus conferences. Analyzing this politics of expert authority is the main thrust of the article.

2. Analytic approach: SSK in action

Setting the stage for this exploration, consensus conferences can initially be conceptualized as tools of scientific democracy, in that they confer on citizens the capacity to take a stand on technoscientific trajectories (Bruun Jensen, 2005: 223). During consensus conferences, experts and counter-experts seek to justify their various cognitive and normative commitments to certain technoscientific issues in front of a lay "jury," giving it some flavor of a courtroom drama (Mohr, 2002: 63–4). Tellingly, enrolled participants in consensus conferences are said to comprise expert and citizen "panels," respectively, adding to the quasi-legal atmosphere. Contrary to the courtroom, however, consensus conferences allow for a multiplicity of perspectives on the issues at hand, rather than a simple duality of "for" or "against." Concomitantly, such conferences stage a more complex politics of expertise

than do most juridical settings.[3] As this article attempts to demonstrate, the 2003 Danish consensus conference on environmental economics as a policy tool proved a particularly vivid illustration.

To investigate this multifaceted drama in more specific terms, the article maps the ways in which views expressed by the assembled citizen panel on environmental economics reflect the dynamics of expert authority permeating the consensus conference. The main part of the article is thus devoted to these expert dynamics of selection, framing, contestation and credibility-management. Before analyzing this, however, I briefly provide introductions to consensus conferences, the Danish macro-political context, and the views of the citizen panel, in order to contextualize the relevant lay–expert relationships. Analytically, this entire discussion is framed by drawing on concepts from within the sociology of scientific knowledge (SSK), notably those of authors such as Bruno Latour, Alan Irwin and Brian Wynne. For lack of space, I do not provide any detailed account of their conceptual frameworks, introducing concepts instead as an integral part of the analysis. In this sense, the article reads as an exercise in "SSK in action."[4]

The particular justification for adopting an SSK perspective on consensus conferences derives from the novel insights gained into their reliance on lay–expert boundaries, negotiation of knowledge claims and the politics of expertise (Mohr, 2002). Within the SSK literature referred to here, scientific knowledge is generally understood as interpretative, mediated and contestable, rather than self-evidently valid and authoritative. Following this assertion, SSK analyses have been influential in opening up the "science–policy nexus" to detailed empirical study of its negotiability, historical contingencies and cross-cultural variations. As Smith (2003: 72–3) points out, most theoretical writings on deliberative democracy, on the other hand, remain highly abstract. By employing concepts from SSK to this real-world instance of public deliberation, I attempt to start bridging some gaps between the political philosophies of deliberative democracy and SSK approaches to the politics of knowledge. Exploring the full theoretical implications of this encounter is beyond the scope of the article.[5] In that sense, the article is explorative rather than explanatory, although some implications flowing from this SSK approach for deliberative democratic practice are sketched out in the end.

In terms of analytic focus, I restrict myself mainly to the micro-politics of expert contestation manifested during the actual conference itself. As temporally and spatially situated events, the politics of expertise involved in consensus conferences is obviously broader than this. Such politics might be said to unfold in different stages, corresponding to an outside–inside–outside pattern, with wider sociopolitical influences being "mediated" into the conference and then brought back out again via, for instance, media reporting (cf. Purdue, 1999). While focusing on the conference itself, I do provide a brief introduction to the pre-conference macro-politics of environmental economics in Denmark. This is done to the effect that preliminary knowledge about this macro context is necessary for understanding the micro-politics of expertise during the conference. However, the somewhat peculiar recent advent of environmental economics in Denmark is not the main topic, deserving rather its own exposition elsewhere.[6] Instead, by focusing on the micro-politics of expert authority permeating this particular consensus conference, I aim to elucidate central dynamics of wider generality to instances of public deliberation. The precise extent of generalizability is necessarily a matter of interpretation, an issue to which I return in the concluding parts of the article.

Methodologically, my account is primarily based on text analysis of conference documents and standard audience participation at the conference itself. This is supplemented by an interview with the responsible DBT project coordinator.[7] Given the objectives of this

study, I acknowledge some limitations inherent in this methodology. However, since no records of citizen panel discussions exist, and since no access is provided to these deliberations, I consider the methods employed here the near-best possible.[8] After all, texts play a crucial role in stabilizing the networks involved in a consensus conference (Mohr, 2002: 68–70). With no access to actual discussions, I rely on the notion that implicitly the citizen statement text signals what types of knowledge and which experts the citizens have agreed to privilege (Fixdal, 1997: 373).[9] While emphasizing the dynamics of expertise, however, the normative view of citizens as passive receivers of expert knowledge should be resisted. Rather, it is a matter of elucidating central citizen–expert interrelations.

In broader normative terms, the article should be read as a "sympathetic criticism" of consensus conferences (cf. Smith, 2003: 57). While highlighting questions of power and expert authority seldom discussed in these contexts, I would still maintain that consensus conferences belong to the best practical models of deliberation around. The DBT has proven consensus conferences to be appropriate and successful in Denmark in the past, and the model has been shown to "travel well" to other sociocultural contexts (Joss, 1998; Einsiedel et al., 2001). Obviously, this does not mean that consensus conferences are flawless, neither ideally nor practically.[10] Indeed, I aim to highlight some of the potential problems of expert authority permeating such deliberative forums. However, for the very reason of the model's relative attractiveness, consensus conferences may legitimately be viewed as "exemplary cases" for discussing the democratization of expert authority (cf. Flyvbjerg, 1998). By examining this and other real-world cases of democratization, we stand to learn by example (Carolan, 2005: 4).

3. Consensus conferences as tools of democracy

In the literature on deliberative democracy, consensus conferences usually figure prominently among the practical models or "experiments" in engaging the public in political decision-making. They normally sit alongside citizens' juries, negotiated rulemaking, action planning workshops and citizen-based advisory committees, all examples of true public participation as opposed to mere communication mechanisms (Rowe and Frewer, 2005). While obviously substantially different, these techniques all draw on common ideal notions of public participation in deliberative processes, characterized by inclusive, unconstrained and reasoned political dialogue (Smith, 2003). Broadly following Habermas' regulative ideal of communicative rationality, such processes are seen to allow citizens to reflect upon preferences and foster mutual understandings (Dryzek, 2000: 1). Amongst the different practical techniques, consensus conferences can be said to possess comparatively attractive features. These include the early involvement of citizens in setting agendas prior to expert involvement, an independence from vested interests and transparency to the public (Rowe and Frewer, 2000: 17–20; Barns, 1996). By 2002, approximately 50 consensus conferences had been held at various venues throughout the world, including the UK, New Zealand and Japan (Brown et al., 2004).[11] This global reach testifies to the popularity of consensus conferences as new tools of policy deliberation on controversial issues relating to biotechnology, medicine or the environment.

As pointed out by Andrew Barry, there is an often ignored technicality to politics. Devices such as press conferences, parliamentary debates, voting by ballot, public demonstrations and opinion polls are all crucial in enabling the exercise of political agency (Barry, 2002). Consensus conferences are no exception, relying as they do on highly structured interactions between citizens and experts (Maranta et al., 2003: 160). Put briefly, consensus

conferences work the following way. The organizers establish a panel of 14 to 16 citizens, taking sociodemographic characteristics into account. Simultaneously, a planning committee of approximately six to eight professional experts in various aspects of the issue is assembled, with the overall task of securing the "disciplinary balance" of the project (DBT, 2003a: 4).[12] Introductory material is written, often by a science journalist, gets accepted by the planning committee and is distributed to the citizens. During preparatory meetings, citizens draft questions and select preferred experts from suggestions put together by the planning committee. At the conference itself, experts answer questions in public sessions, before the citizen panel write down their common opinions in a final document. This document then gets distributed to relevant stakeholders. Significantly, in the Danish context, the DBT has strong links to the national parliament, raising the chance of policy impact (Rowe and Frewer, 2000; Joss, 1998).

As tools of democratic deliberation, consensus conferences are thus clearly not "unconstrained" in the sense of communicative rationality. However, public deliberation is often appropriately justified in terms of three virtues (Pellizzoni, 2001: 66–8). First, it involves a *civic virtue*, producing more informed, active, cooperative and thus "better" citizens. Second, it provides *governance virtue* in the sense of enhancing the legitimacy of decisions. Third, it promises *cognitive virtue* by articulating viewpoints clearly, bringing different perspectives to an issue and clarifying substantive controversies. In this article, I want to highlight a specific conception of the cognitive virtue aspect of consensus conferences, related to the public contesting of dominant scientific viewpoints (Goven, 2003). Doing so, however, I abandon the "strong" Habermasian conception of cognitive virtue as the consensual singling out of the best argument (Pellizzoni, 2001). Instead, I consider it more adequate to note how consensus conferences are in valuable respects also "expert dissent conferences" (O'Neill, 2007). Consensus conferences can serve to publicly reveal expert commitments and disagreements, thus carrying the potential for heightened self-awareness amongst narrow expert cultures (Wynne, 1996a: 43). Additionally, disclosing expert disagreements is a precondition for citizens to exercise reasoned judgment between validity claims, since knowledge about arguments from other perspectives is needed to foster "rational skepticism." Employing such rational skepticism, citizens may in turn reach sensible practical solutions to bounded, practical problems. In sum, this may be considered a "weak" version of the cognitive virtue view on consensus conferences (cf. Pellizzoni, 1999: 119–20). However, the structural characteristics of consensus conference deliberations still make them much more likely providers of such virtues than ordinary processes of public communication.

As well as being "expert dissent conferences," consensus conferences in general, and the conference on environmental economics in particular, can usefully be conceptualized as "extended peer communities" for technoscientific professionals (Fixdal, 1997).[13] During these conferences, the usually secluded worlds of scientific and technological practices are rendered more or less transparent to a lay audience, which comes to function as part of the deliberating peer group. Technoscientific "black boxes," that is accepted knowledge hitherto taken for granted as matters of fact (cf. Latour, 1987: 2), are hence potentially opened up for public scrutiny. Such scrutiny may pertain to any of the supporting components, or "allies," comprising scientific black boxes, including theoretical paradigms, methodological principles, common practices, instruments, organizations, people, and so forth. During the particular consensus conference under study, the black box of environmental economics, together with environmental economists themselves, was staged for scrutiny in what might be called a "public trial of strength." With their public reputation at stake, representatives of the "epistemic community" of environmental economists worked hard to convince citizens of the

validity and political usefulness of their work (cf. Haas, 1992). Meanwhile, various expert "dissenters" worked to challenge these aspirations in multiple ways, creating a micro-cosmos of expert negotiation whose outcome could not be determined in advance and where knowledge was hence in-the-making.

What is particularly noteworthy about this case is the explicit way in which a scientific black box is opened in front of the public, with "scientific citizens" having the last word regarding its applicability to issues of common concern (cf. Irwin and Michael, 2003). Contrary to most previous consensus conferences, which have focused on specific technological issues such as genetically modified organisms (GMOs) or cloning, this conference explicitly staged the very expertise of environmental economists on a public trial. Rather than material technologies, what was being scrutinized was the "intellectual technologies" of environmental economics (cf. Miller and Rose, 1990). While obviously important, this difference should not be exaggerated, especially since material and intellectual technologies inevitably intertwine, as seen for instance in the reliance of environmental economics on material infrastructures of pollution sensors, computer simulations, databases and so on (cf. Barry, 2001; Asdal, 1998). However, one may still observe that the linkage between the intellectual technologies under scrutiny and a particular epistemic community, that of environmental economists, was tighter in this case than is usual for consensus conferences. This does not, I argue, make the conference under study exceptional or deviant. Instead it means that one generic feature of consensus conferences, their micro-politics of expertise, is particularly striking in this case. Hence it becomes a privileged site for studying the unfolding of such politics of expertise, understood as a structured dispute over the cognitive and social authority of a body of specialized scientific knowledge (cf. Pellizzoni, 2003).[14]

In what follows, I analyze how and why environmental economists failed somewhat in this public trial. First, I briefly examine the importance of the macro-political context of environmental economics in Denmark (section 4). I then introduce in some more detail the public understanding of environmental economics, as manifested in the citizens' statement (section 5). This serves as background for section 6, which presents the main empirical analysis of the politics of expert authority during the conference itself. Finally, in section 7, the main argument is summarized and some more general suggestions as to the democratizing potentials of consensus conferences are put forward.

4. The macro-politics of environmental economics

Consensus conferences deal with technoscientific topics of relevance to the public and of an uncertain, contested and controversial character (Fixdal, 1997: 370). It might thus at first seem surprising that an esoteric sub-discipline of economics has come to be viewed as broadly relevant to the Danish public. As explored below, the impacts of controversial statistician Bjørn Lomborg and "his" Institute for Environmental Assessment (IMV) could hardly be exaggerated in this regard (Harste, 2003). Additionally, environmental economics is a highly policy-relevant science, and environmental economists often perform as policy advisors. As such, the field inhabits a "science–policy nexus," in which knowledge production is at least partly inseparable from policy processes (cf. van der Sluijs et al., 1998). Much environmental economics is "regulatory science" in Sheila Jasanoff's (1990) sense: knowledge developed in response to the requirements of government and industry. Indeed, the relatively recent rise to prominence of environmental economic policy advice in Denmark formed the explicitly acknowledged background to the entire conference (DBT, 2003a: 2).

In 2001, the current Danish right-of-center government introduced a novel catchphrase to the discourse on environmental policy: "more environment for money" (Corry, 2003). The catchphrase signaled at least two policy commitments: a general predilection for resource-efficient environmental policy and a greater reliance on environmental economic policy advice. Regarding the former, the government took steps to reduce state environmental spending, often attracting widespread public criticism (Jamison, 2003). As for the politics of expertise, the new government-affiliated policy research Institute for Environmental Assessment (IMV) was created during 2002, relying largely on environmental cost–benefit analysis. The controversial "anti-environmentalist"[15] Lomborg was appointed managing director of IMV. While formally independent, the government's simultaneous endorsement of environmental economics and Lomborg raised suspicion amongst environmental scientists and left-of-center politicians. Some viewed IMV largely as a government tool for legitimizing cutbacks in state environmental spending. Owing to sustained media attention, by the time of the May 2003 consensus conference, environmental economics was already highly politicized at the level of national government.

This political context inevitably influenced the consensus conference on several levels. While he was not physically present, the issue of Lomborg haunted the expert panel, contributing to tensions amongst representatives of IMV and experts from other institutions. One obvious example saw a natural scientist explicitly criticizing IMV reports and emphasizing the "well-known political attitudes of its managing director" (DBT, 2003a: 50). Most probably, established "story-lines" (cf. Hajer, 1995) linking Lomborg, environmental economics, and state cutbacks on environmental spending likewise contributed to general skepticism and mistrust amongst citizen panel members. In regard to post-conference reactions by politicians, the fact that environmental economics had already produced solid political positions may help explain why the parliamentary group on environmental policy did not discuss the citizens' statement (cf. Fixdal, 1997: 370). The current government was simply committed to environmental economics already. According to the DBT project coordinator, this relative lack of political interest is both atypical and disappointing. However, it does not necessarily render the conference ineffectual, as media reporting and interest generated within professional environmental communities are likely to exert some degree of influence on opinion-forming processes.[16]

Perhaps more fundamentally, however, the recent government endorsement of environmental economics helped frame the agenda for discussion. According to the project coordinator, the DBT deliberately sought to escape the highly polarized "for-or-against" rhetoric, opting instead for an investigation of strengths and weaknesses of the tools of environmental economics. The underlying framing assumption seems to have been that environmental economics would become increasingly influential in the future. In the information material prepared prior to deliberations, this assumption is stated in the opening paragraphs, complemented by similar statements by a government representative (DBT, 2003b: 2, 27–8). While not necessarily pre-empting the citizens' option of downright rejection, this prior framing did introduce a level of political realism. Rejecting environmental economics on purely cognitive or ethical grounds would arguably be politically naive in this context. Most likely, this framing is an important factor behind the "yes but" character of the citizen panel's statement, as explored in more detail below. The point here is not to suggest that the DBT somehow biased the discussion. Rather, the fairly obvious implication is that real-world mechanisms of deliberative democracy take place against power asymmetries and can hardly be abstracted from its macro-political context (O'Neill, 2007). Accordingly, questions of deliberative legitimacy and cognitive virtue cannot be settled in the abstract, but need sensitivity to both the macro-political context and the micro-politics of expert authority.

5. Environmental economics as a citizens' concern

As a type of specialized knowledge likely to impact on future Danish environmental policy, environmental economics hence came to be defined as a concern for scientific citizens during this consensus conference. Concomitantly, as already noted, environmental economists were forced into attempts of justifying their shared commitments towards the assembled lay audience effectively acting as an extended peer group. Before turning to the main arguments concerning the micro-politics of expertise involved in these attempts, it proves useful to consider a related question: on balance, how successful were environmental economists in defending their methodological and normative viewpoints to the lay audience? Accessing the citizens' understanding of environmental economics, as manifested in their consensus statement, provides a first step towards interpreting the dynamics of expert credibility and contestation so crucial in shaping the outcome of consensus conferences.

At the most general level, as noted above, the citizen panel's view on environmental economics might be summarized as a "yes but": "the method can be justified as a useful practical tool … provided certain fundamental conditions are fulfilled" (DBT, 2003a: 11). Rather than simply saying yes or no to environmental economics, citizens provided a considered analysis of its potentials and dangers.[17] As already argued, part of the explanation for this "yes but" outcome should be sought in the macro-political context surrounding and framing the consensus conference. Still, if anything, citizens' viewpoints lean towards skepticism. They stress the importance of "fundamental values" regarding human life, nature and future generations, and sum up their conclusions in the following catchphrase: "money isn't everything—our environment is precious" (DBT, 2003a: 11). As such, the thrust of the citizens' statement may legitimately be viewed as being at odds with the above-mentioned "more environment for money" policy commitments of the current Danish government.

More specifically, the following conditions and criticisms from the final citizens' document can be highlighted as essential for further analysis (DBT, 2003a: 11–20):[18]

- Expert disagreements: "environmental economists seem to disagree amongst themselves" on issues of application and choice of discount rate.[19]
- Uncertainty: environmental economics is characterized by major uncertainties, which "should always be clearly and publicly stated in analyses."
- Interdisciplinary cooperation: experts from disciplines such as sociology, psychology and medicine should be included in research design and peer control, to counter the "narrowly rational view of humans and the world in environmental economics."
- Consumer versus citizen: willingness-to-pay studies suffer from an "overemphasis on the role of humans as consumers rather than citizens."
- Political responsibility: "ethical considerations should not be left to economists," and politicians should provide the goals of environmental policy, stressing the importance of the precautionary principle.
- Ethical considerations: environmental economics risks "suspending other ethical values such as community, care, [and] respect for the individual …"

While space precludes systematic discussion of this public understanding of environmental economics, a few remarks about its character are warranted. As is evident, ethical considerations are generally given a prominent position and framed as weak spots of environmental economics, along lines well established in political philosophical debates (e.g. Paavola and Bromley, 2002: 5–10). Perhaps more significantly, many of the critical points concern the social and institutional arrangements surrounding the production of environmental economic

analysis. This is true for citizens' concerns about political responsibility, interdisciplinary cooperation and uncertainties. By focusing on such institutional arrangements, the citizen panel highlights the inevitably social and political character of environmental economics as regulatory science. Generally, the citizen panel recommendations hereby suggest conditions for making environmental economic analysis more socially trustworthy, rather than simply scientifically valid in a narrow sense. This observation is in line with SSK research on lay criteria for judging scientific claims (Wynne, 1996a). In short, environmental economists can be said to have been less-than-successful in this public trial. Exploring why is the task of the remainder of the article.

6. Framing, selecting and contesting expertise

Consensus conferences rely on a fundamental binary identity construction, where citizens confront experts in a structured dialogue. Much of the rationale and dynamics of consensus conferences stems from the deep ambiguities of these categories.[20] At one level, the binary opposition creates an emphasis on the "lay-ness" of citizens, making consensus conferences seem like elaborate educational exercises in the "Public Understanding of Science" (PUS) (Purdue, 1996; Elam and Bertilsson, 2002). As stated in connection to their cognitive virtues, however, such conferences also derive their rationale from citizens' opportunity to critically scrutinize and discursively challenge expert forms of authority (Smith, 2003: 65). Citizens are empowered to exercise their scientific citizenship, increasing the democratic legitimacy of the science–policy nexus (Irwin and Michael, 2003: 43–55). In this reading, the "lay-ness" of experts potentially becomes visible, highlighting the social commitments and values embedded in scientific knowledge (cf. Wynne, 1996b). This point is testified to by the ambivalent position of experts during consensus conferences. While on the one hand experts retain their role of key informants and advisors, their privileged status is on the other hand downplayed by the inclusion of lay participants in the deliberating peer group (Pellizzoni, 2003: 338). Indeed, in the case of environmental economic expertise, its socially contested and controversial nature formed the rationale for public scrutiny and deliberation. Likewise, the explicitly stated objectives of the conference included public education, knowledge of public attitudes, and the cognitive scrutiny of environmental economics (DBT, 2003c: 2). Such ambiguities of objectives and identities necessarily influence and shape the terms of political engagement between lay and expert actors.

In their very institutional structure, consensus conferences thus mirror existing inequalities of scientific competence and "cognitive authority" in modern societies (O'Neill, 2007; Turner, 2003: 24–9). Another ambiguity in the citizen–expert relationship is hereby introduced: while citizens ideally internalize some expert knowledge, the impenetrable semantics and social status of experts may lend them too much authority in discussions (Fixdal, 1997: 372). Environmental economics is a complex field of knowledge, and given time constraints much will rely on the testimony of individual environmental economists. Rather than citizens simply assessing information, expert authority is likely to be evaluated in light of institutional affiliation, disciplinary background, communication skills and general social demeanor (Aldred and Jacobs, 2000; Purdue, 1999: 84). This is not a shortcoming of the model but a precondition.[21] However, it does make expert selection crucial to consensus conferences, since legitimacy often hinges on perceptions of a fairly balanced expert panel. As the project coordinator acknowledges, it forms an essential part of the "methodological responsibility" of the DBT to make this aspect of the conference "impeccable." But who exactly is an expert on environmental economics as a policy tool?

Table 1: Educational and institutional composition of the expert panel

		Institutional affiliation by educational background					
Educational background	Total number in panel	Academic	Public policy advice	Private consultancy	Environmental administration	Environmental NGO	Member of Parliament
Environmental economists	7	2	3	1	1		
Economists, other	2	2					
Natural scientists	4	3				1	
Political scientists	3		3				
Other	3		2				1

Environmental economists should obviously be included. In the final composition of the panel, nine out of 19 experts were economists by education, with seven currently specializing in environmental economics (see Table 1). As part of the balancing, their institutional affiliations were spread widely, mainly between academia and public policy advice. However, various non-economists were included as experts as well. Three natural scientists from different disciplines provided expertise on the material aspects of environmental issues, while three political scientists (and a politician) covered the policy aspects. Ethics and environmental values were left in different ways to representatives of the Ethical Council, the Nature Conservancy non-governmental organization (NGO), and an environmental sociologist. Clearly, this heterogeneous group represents a broad range of perspectives on and interests in environmental economics, encompassing both "scientific" and "opinion-forming" experts (Fixdal, 1997: 372). Important inter-expert tensions were evident, notably between economic experts and counter-experts from natural science, ethics and sociology; and between supposedly independent academic and dependent government and industry experts (cf. Purdue, 1996: 533–6). Expert identities at consensus conferences are essentially contested, and expert heterogeneity is crucial for realizing its cognitive virtues.

Depending on perspective, questions can always be raised as to the inclusiveness of the expert representations. From within "green" political theory, the question of representing nature in deliberation commands special attention (Dryzek, 2000: ch. 6; Eckersley, 1999). In this case, while natural scientists might be assumed to "translate" the mute interests of nature,[22] a moral defense of the intrinsic value of nature was left almost exclusively to the Nature Conservancy representative (DBT, 2003a: 37–8). Throughout her presentation, she stressed the dangers of environmental economics inadvertently turning nature into a commodity, thus emphasizing the limits to economic use-value thinking. Apart from this, issues regarding the fundamental metaphor of "natural capital" underlying environmental economics were left almost untouched (cf. Åkerman, 2003). Furthermore, it seems curious that no self-declared ecological economists were included in the expert panel.[23] Important as such observations are they suffer from their counterfactual character: we do not know if the citizen panel would have judged differently, had other forms of expertise been present. As it turned out, the expert panel was sufficiently heterogeneous to create ubiquitous expert disagreements, some aspects of which are dealt with next.

Facts, values and work of purification

While few people in the conference would probably deny the "value-relevance" of environmental economics, the role of "value-judgments" within the discipline was a constant

source of contention.[24] The citizen panel was obviously concerned with both narrowly scientific and broader political, cultural and ethical aspects of this intellectual technology. Still, for all the potential intermixing, much of the discussion seemed to implicitly assume a "black box" view of environmental economics itself, conceptually separating professional-technical from ethical-political dimensions (cf. Barns, 1996: 203–7). This implicit framework is also visible, if not all-dominant, in the very structuring of questions by the citizen panel, keeping scientific aspects away from the "ethics and culture" block. By implication, expert contributions largely followed this pattern, with environmental economists answering technical questions and non-economists tackling the ethical-political dimensions. While partly justifiable in terms of keeping experts within their areas of expertise, this framework carries its own limitations. First of all, it conveys an image of environmental economics as suffering from methodological rather than foundational problems. Secondly, it relies on questionable notions of politics somehow coming "after" the scientific economic analysis.

Put theoretically, this fundamental structuring of the consensus conference bears witness to what Latour (1993: ch. 2) calls the "Modern Constitution," legislating the separation of science from politics, knowledge from power, facts from values. In Latourian terms, however, these distinctions are never solid and inflexible: they rely on a constant "work of purification," keeping from sight the myriad boundary crossings (Latour, 1993: 11). As previously argued, environmental economics might generally be said to occupy just such a "hybrid" network position in between science and policy. Looking at the expert contributions to the consensus conference, much hard work of purification is evident. Right from the background material, environmental economics was presented as suffering "methodological" shortcomings, as when monetary valuation of biodiversity is said to fail due to lack of "systematic scientific research" (DBT, 2003b: 6). Debates on uncertainties likewise tended to focus on "lack of data," again ignoring harder questions of ignorance and the "unknown unknowns." Even more fundamentally, a "purified" distinction between economics and politics provided the framework for widespread expert ideas that, while economists provide the facts, politicians provide the values. Noticeably, traces of this work of purification are arguably also visible in the citizen panel's views on uncertainty and political responsibility, although less so on other of its expressed concerns.

Importantly, however, this "Modern Constitution" framing did not go unchallenged, although potent attacks did not primarily come from the "ethics experts." Concerns raised by the Nature Conservancy representative on commoditization of nature and by the Ethical Council representative on rationality and romanticism could easily be dismissed as too vague and unspecific.[25] Rather, "a-modern" reflections on human values *in* environmental economics came primarily from two experts—a natural scientist and an environmental sociologist—who could credibly claim to master the economic technicalities at stake (cf. Wynne, 1996b: 365). Their contributions are termed "a-modern" in the Latourian sense of simultaneously recognizing the "work of purification" and the boundary crossings between facts and values going on underneath ("work of translation") (Latour, 1993). Such reflections require "hybrid" forms of expertise. The natural scientist, well-spoken, authoritative and internationally recognized, talked about uncertainties, ignorance and the precautionary principle, highlighting the "unknown unknowns" and thus challenging environmental economists' much more narrow conception of uncertainty (DBT, 2003a: 97–115; Harremoüs et al., 2002). When judging from the prominence given to the precautionary principle in the citizens' statement, his challenges struck a chord with their concerns. Stressing the precautionary principle seems to have been the citizens' way of suggesting a more defensible green decision rule than environmental cost–benefit analysis (cf. Eckersley, 1999).

The environmental sociologist, possessing experience in contingent valuation survey methods, forcefully highlighted the limits of the utilitarian logic of environmental economics. Interestingly, aspects of her presentation regarding ethical considerations and the citizen-versus-consumer problem resurfaced almost word-for-word in the citizens' statement, suggesting her high credibility in the context (DBT, 2003a: 92–5). Indeed, citizens' concern about the potential suspension of non-monetary values seems to refer almost exclusively to this testimony. Furthermore, in a symbolic attack on environmental economics, the sociologist suggested to set the discount rate at zero, thus self-consciously obfuscating the logic of quantification over time. While aware that a discount rate of zero would dismantle the intellectual machinery of environmental economics, economists were forced by this very suggestion into debates exposing the range of expert opinions on this essential issue. Accordingly, expert disagreement on the discount rate is given prominence in the citizens' statement. Amongst the experts present, the environmental sociologist arguably used the dramaturgical aspects of consensus conferences most effectively. Rather than simply talking about value-commitments and expert disagreements in environmental economics, she actively staged them for the citizen panel (cf. Purdue, 1999: 84). This kind of "credibility-management" (cf. Shapin, 1995: 258) was highly influential in opening up the black box of environmental economics to democratic entry.

Uncertainty, rhetoric and credibility

In the micro-politics of consensus conferences, much thus depends on the "credibility-economy" of expert testimonies. As well as already mentioned factors such as intellectual rigor and institutional affiliation, space is open for individual credibility-management along rhetorical lines. Similar to what Brian L. Campbell has shown in the case of a Canadian public inquiry, the rhetorics of uncertainty and expert consensus were central to these credibility-disputes (Campbell, 1985). This is hardly surprising, given that judgments on uncertainties are likely to influence citizens' attitudes (Shapin, 1995: 269). While critics of environmental economics would generally point to major uncertainties, its "promoters" pointed to a basic consensus on principles and methods amongst practitioners (DBT, 2003a: 77, 89). However, supplementary lines of rhetorical arguments were also brought forward. One environmental economist thus emphasized the pragmatics of the "trust in numbers": even if uncertainties are huge, "*a* number is better than *no* number" when making the environment count in decision-making (DBT, 2003a: 81).[26] Additionally, several promoters made essentially the same point, stressing how uncertainties in environmental economics stem from "imperfect natural scientific knowledge" (DBT, 2003a: 89). While this may be partly true, the rhetorical effect of blaming natural scientists for uncertainties while "purifying" economics was hard to miss for the lay audience.

Significantly, however, promoters of environmental economics seem to have failed in their art of persuasion. As outlined, in their final statement the citizens clearly pointed to persistent expert disagreements, major uncertainties and limits to monetary valuation. Contrary to environmental economists' preoccupations, they highlighted institutional preconditions for trusting environmental economic expertise, given their judgments of its very limitations. In terms of the science–policy nexus, some of the citizen recommendations read as fairly standard anti-technocracy viewpoints, such as the point about politicians retaining final responsibility in environmental policy. Other recommendations, however, show citizens to be more proactive. In particular, interdisciplinary cooperation and peer control is highlighted as one major credibility-enhancing mechanism. As emphasized by SSK analysts such as

Funtowicz/Ravetz and Wynne, "socially extended peer groups" are crucial for the greater public legitimacy of science (Wynne, 1996a: 39).[27] During this consensus conference, citizens seem to have reached similar conclusions. Notably, however, the citizen panel suggested only a scientific peer group extension, including natural scientists and other social scientists to counter the framework of environmental economics. They did not propose to include lay people or stakeholders in this process, thus pragmatically solving the issue of demarcation between expertise and non-expertise.

Quite possibly, this point reflects a performative judgment of the expert panel dynamics on the part of lay citizens. During the conference, environmental economists *demonstrated* themselves to have "narrowly rational views of humans and the world," while sociologists and natural scientists *proved* themselves credible participants to these discussions. According to the project coordinator, members of the citizen panel generally "lost some respect for the environmental economic experts" during the conference because of the economists' "inability to listen to their concerns." The non-economist experts, by contrast, seem to have enjoyed more credibility in the context. Arguably, this is not a case of citizens misunderstanding environmental economists. Rather, the latter misunderstood the former's criteria for judging scientific credibility, by failing to reflect upon their own social positioning and value commitments (cf. Wynne, 1996a: 43). One particularly striking example of this discrepancy concerned the treatment of expert disagreements on the discount rate. While environmental economists talked about discount rates in purely scientific terms, citizens were much more concerned with the socially real danger of "manipulation" within the closed networks of regulatory science. Hence, they suggested the need for an established consensus, to constrain the variability of environmental economic analysis and enhance transparency to the public. In general, environmental economists were thus continuously reminded of Theodore Porter's (1995: 214) observation on *Trust in Numbers*: "it requires institutional or personal credibility even to produce impersonal numbers."

7. Discussion: expert dissent and democratization

Environmental economic expertise was put on public trial in Denmark and barely made it through. This article has reflected on some reasons why, focusing on the politics of expertise permeating consensus conferences. Drawing on concepts from SSK, the conference is conceptualized as an "extended peer community" for environmental economists, in which they were forced into attempts of justifying their otherwise "black boxed" cognitive and normative commitments to a lay audience. Several dimensions of this politics of expertise stand out. The macro-politics of environmental economics in Denmark provided the politicized context for the consensus conference, adding layers of political realism to the cognitive and ethical deliberations. Internal terms of engagement relied on micro-level questions of framing, selecting and contesting expertise, involving multiple and flexible expert identities in a complex credibility-economy of individual testimonies. Fundamentally "modern" assumptions promoted the "black box" view of environmental economics, separating facts from values. But this boundary-maintaining work was open to discursive challenges. Potent demonstrations of human values *inside* the black box required not just ethical insight but technical credibility, making it a somewhat scarce resource in deliberations. Once utilized, this "hybrid" expertise seemingly enjoyed major credibility advantages, resonating well with citizens' crosscutting concerns.

Indeed, the failure of environmental economists themselves to reflect on their social positioning and value commitments may well provide the key to understanding their less-than-successful defense amongst scientific citizens. These reflections are not meant to suggest that consensus conferences are merely power struggles between experts, devoid of deliberative legitimacy. Focusing on the politics of expertise permeating models of public participation rather serves to question certain depoliticized approaches to deliberative democracy, including what seems to be a dominant self-conception of the Danish Board of Technology (cf. Bruun Jensen, 2005: 229). Their, and others', attempts at using the language of "unconstrained communicative rationality" and "free consensus building" simply misrepresent the realities of deliberation in actual policy processes. This is not so much a critique of Habermas, as he remains fairly clear on the purpose of normative idealizations in a broader project of discourse ethics (Habermas, 1993). However, when applied to practical contexts, such depoliticized language becomes counterproductive. Moreover, denying the unavoidable importance of framing, selecting and contesting expertise may lead to distorting normative commitments. Instead, theories and practices of deliberative democracy should engage more openly with the politics of expert authority, in order to fully realize its potential for democratizing expertise.

Not all forms of scientific knowledge and expertise lend themselves to, or are in need of, public participation and democratization (Collins and Evans, 2002). However, in cases characterized by radical uncertainty, fact–value overlap and intractable controversies, as so often experienced in environmental decision-making, public participation promises cognitive virtues (Pellizzoni, 2003). On the basis of this case study, I argue that the democratic potential of consensus conferences is intimately tied to, and indeed may well depend upon, the public contestation of scientific judgments and assumptions. Disclosing expert commitments and disagreements serves as a minimal precondition for citizens to exercise "rational skepticism" towards dominant scientific claims. Whenever intractable controversies occur, ranging from environmental economics to GMOs, electromagnetic fields and climate change, consensus may thus be too ambitious a goal (Pellizzoni, 2001; Smith, 2003: 58–61). Rather, staging expert dissent may foster heightened self-awareness amongst narrow specialists, as well as enabling reasonable judgments from reflexive citizens to gain public recognition.[28] Such cognitive virtues, I argue, may in turn exert positive influence on the democratic workings of the science–policy nexus, beyond the confines of consensus conferences themselves. In this sense, such conferences may function both as mediators and clarifiers of public controversies, potentially enhancing the democratic legitimacy of successive expert-based political decision-making.

Much, however, depends on the willingness and ability of experts to engage in reflexive scrutiny of their knowledge claims. Indeed, at some stage during the expert testimonies, the conference moderator jokingly suggested the need for a consensus conference for experts afterwards. As is often the case with jokes, it might have carried a profound truth. Environmental economists simply find it hard to respect notions of value incommensurability and beauty beyond price (Whiteside, 2002: 291). According to an informal post-conference survey conducted by the project coordinator amongst expert panel members, some environmental economists likewise expressed little appreciation of citizens' value perspectives, noting only how they apparently "would not listen." In "knowledge societies" characterized by extreme specialization, however, democratizing expertise is as much a learning experience for experts as it is for citizens. To complement the public understanding of science, we may well be in need of efforts to enhance "experts' understanding of publics." In the language of Collins and Evans (2002), experts need to develop more "interactional expertise" to appreciate the socially contextual and crosscutting knowledge contributions of

lay citizens. Quite possibly, this will not come about without some form of science policy innovation. Ideas of "extended peer communities" provide one suggestive avenue along which reforms could be sought.

Having set out this potential for democratization, I want to end by briefly noting some of the practical implications for future public participation projects.[29] Most fundamentally, these reflections point to a crucial challenge of *initial framing* (cf. Jasanoff, 2003). Care should be taken in presenting the issues to citizens, keeping ethical, cognitive, and political spaces as open and flexible as possible, subject to contestation. In particular, too strong attachments to prior political commitments should be avoided, in order not to preclude certain possible futures. Secondly, this case points to the importance of *expert selection*. The democratic potential of deliberative projects depends on preventing any homogenization of expert panels, in either disciplinary, institutional or value-orientation terms (Bruun Jensen, 2005: 232). In particular, searching out heterogeneous forms of expertise in the shape of "hybrid" experts, combining technical and ethical competencies, seems all-important. This relates to a third challenge of *boundary crossing*. Simply relying too strictly on pre-established separations between ostensible facts and values, or between technical, social and ethical dimensions of a particular controversy, carries strong limitations for democratizing expertise. Instead, opportunities should be fostered for challenging and re-negotiating these boundaries, for instance when selecting and enrolling experts to specific tasks. Finally, a fourth challenge consists in enhancing the *consequences* of citizens' viewpoints. This challenge reaches beyond the DBT and lies as much with politicians and experts who ought to take citizens seriously (Bruun Jensen, 2005: 233). In particular, as should be clear from this case study, democratizing expertise in the "knowledge society" will depend crucially on the willingness of experts, and their political sponsors, to allow scientific citizens to influence their formerly autonomous republic. In the case of environmental economics in Denmark, this willingness seems to have been somewhat lacking. Hence, arguably, the full democratizing potential of this consensus conference was not realized, although important cognitive virtues may still have been manifested.

To return finally to the more general issues surrounding the democratization of expertise, it has been noted (Elam and Bertilsson, 2002) how the level of engagement with science enacted through processes of public participation will be highly variable, depending on the design of these tools of democracy. According to critics, the emerging policy vogue for "listening to the public" through participatory measures may end up seriously limiting the legitimate space for expressions of dissent, by imposing science-centered notions of citizen incompetence (e.g. Wynne, 2005). While recognizing this danger, on the basis of this case study I want to tentatively suggest that, given that the above challenges are seriously addressed, meaningful public engagement can ensue from consensus conferences, providing them with significant cognitive virtue. As such, they form important experiments in "doing" the democratization of expertise. Importantly, however, we need to pay simultaneous attention to other "interaction media" for the enactment of this democratization: science centers and exhibitions (e.g. Maranta et al., 2003), lay involvement in the co-production of knowledge (e.g. Callon, 1999), and community-based knowledge-exchange networks (e.g. Carolan, 2005), to name some. Democratizing expertise is unlikely to be a homogeneous process and we need sensitivity to the specific prospects and limitations of each medium. As for consensus conferences, for all their potential cognitive virtues, they remain singular, short-term events, with no guarantee of lasting impacts (Mohr, 2002). Figuring out how the democratization of expertise may be institutionalized into new forms of regular science–society "contracts" thus remains one of the major challenges ahead.

Acknowledgements

I thank the Danish Board of Technology, and especially the responsible environmental economics project coordinator, for taking time to participate in interviewing and providing helpful background information. In addition, I thank John O'Neill (Manchester University) and three anonymous reviewers for useful comments on an earlier version of the article.

Notes

1 To the extent that this has in fact been attempted, the focus has most often been on evaluating the scope of lay people's involvement, e.g. Guston (1999), Aldred and Jacobs (2000) and Rowe et al. (2004).
2 Sagoff (1988) is a particularly well-known example of a philosophically grounded, environmentalist critique.
3 I am grateful to an anonymous reviewer for directing my attention to the limits of the juridical analogy for analyzing consensus conferences. Still, one should also resist the parallel temptation of simplifying the politics of expertise in legal settings. As Sheila Jasanoff in particular has convincingly shown, this cannot be captured adequately by a winner–loser dichotomy (e.g. Jasanoff, 1996).
4 To paraphrase the title of Latour's famous ethnography of scientific practice from 1987, *Science in Action*.
5 In particular, such explorations would have to deal with complex normative issues of democratic legitimacy vis-a-vis science, technology, expertise and politics. While normative justification is a hallmark of much deliberative democracy theory, SSK tends to be much more empirical and descriptive. In this article, I adopt the pragmatic approach of combining an SSK-inspired analysis with a minimal conception of "cognitive virtue," as defined in section 3. For a much more ambitious, elaborated, and radical, attempt at reconciliation between SSK and democratic theorizing by a leading SSK proponent, see Latour (2004).
6 For an English-language introduction, see Andrew Jamison's recent writings on the Lomborg spectacle (2003, 2004). While perceptive, his analysis does not, and indeed does not attempt to, capture the full complexity of the situation surrounding environmental economic expertise in Denmark. This is the topic of a recent article of mine, entitled (in Danish): "The Culture of Natural Capital: On the Rise of Environmental Economic Expertise in Denmark", to appear medio 2007 in the collected Danish-language volume *Ecological Modernisation in Danish – Changes in Environmental Protection*, Copenhagen: Frydenlund.
7 Telephone interview conducted 2 April 2004. For reasons of anonymity, throughout the paper I refer to people by their position rather than by their name.
8 In his recent study of a consensus conference, Casper Bruun Jensen (2005) does in fact gain access to expert panel deliberations, by becoming himself a member of this. This "participant observation" ethnography obviously entails advantages, but it also involves a risk of "going native" and losing analytic distance.
9 I obviously acknowledge that this final statement is most probably the product of negotiation and compromise amongst participating citizens. Nevertheless, it does represent a consensus statement.
10 For convincing analyses pointing to problematic aspects of particular consensus conferences in the UK, France and Denmark, respectively, see Purdue (1996), Marris and Joly (1999), and Bruun Jensen (2005).
11 The Loka Institute (http://www.loka.org/pages/worldpanels.htm) provides a full list of consensus conferences worldwide up until 2002.
12 Throughout the paper, I refer to the DBT's final report on the consensus conference, called (in Danish) *Pricing the Environment?* (Pris på miljøet?).
13 The term "extended peer community" is proposed by Funtowicz and Ravetz (1992) in their analysis of "post-normal" science.
14 As evidenced by my wording, I consider environmental economics, as well as its mother discipline of economics, to be "sciences" in a general sense of this term. Hence, its certified practitioners possess specialized scientific knowledge. Needless to say, the scientific status, or lack hereof, of economics is the topic of protracted academic debate, particularly in the shape of self-scrutiny by economists (e.g. Yonay, 1998). Likewise, the scientific expertise of economists, while omnipresent, is regularly contested in public debates. Analyzing the impact of these factors on the consensus conference would, however, prove extremely difficult. Still, I am grateful to an anonymous reviewer for pointing out this underdeveloped aspect of my study.
15 This label has widely been attached to Lomborg since the 1998 publication (in Danish) of his book *The Sceptical Environmentalist*. Lomborg himself would reject the label, viewing himself instead as a defender of environmental rationality. For an interesting analysis of the politics of Lomborg, see Jamison (2004).
16 Apart from these brief observations, suggesting lower-than-normal potential influence, no attempt is made here to assess political impacts. See Joss (1998) and Guston (1999) for rare attempts at studying consensus conference impacts in Denmark and the US, respectively.

17 This result is in line with experiences from previous consensus conferences (Marris and Joly, 1999: 17).
18 Needless to say, these points necessarily represent a selective reading. However, combined with the general statements above, I believe they do convey the overall message of the citizen panel in a balanced manner.
19 In environmental economic cost–benefit analysis, the discount rate signifies the percentage rate at which future cost and benefit streams should be discounted, or diminished, to take account of so-called myopic time preferences. In simpler terms, the larger the discount rate, the less long-term future events will "count" today. Not surprisingly, choice of discount rate is a major source of dispute amongst environmental economists. I return to aspects of these disputes in section 6 of the article.
20 These ambiguities are certainly acknowledged by the DBT, as seen in the awareness surrounding the selection of experts and the attempts to screen out "hidden experts" amongst citizen panel applicants (Bruun Jensen, 2005: 226).
21 Besides, on the philosophical level, it does not entail a slip into irrationalism. Indeed, on the basis of Aristotle, it is possible to provide accounts of the rational judgments of reliable testimonies (cf. O'Neill, 1993: ch. 8). Hence the notion of "rational skepticism" employed in this article.
22 To Latour and his co-worker Callon, "translation" refers to the task of speaking in the name of other entities (Yonay, 1994).
23 Denmark has several practicing ecological economists, at least one of whom (Inge Røpke) is internationally recognized, meaning that supply of expertise cannot be the reason.
24 I borrow these Weberian terms for their analytical value, not to signal adherence to his position of "value-freedom" in science (cf. Keat and Urry, 1982).
25 This remark obviously relies on my own judgment of their respective contributions.
26 This phrase is a quote from memory of his oral presentation.
27 Indeed, as already mentioned, consensus conferences may themselves be viewed as just such "socially extended peer groups" (Fixdal, 1997).
28 Reasonable judgments are evidenced, I would argue, by several of the citizens' recommendations on environmental economics. By implication, I acknowledge that my own procedural account of the conference certainly is not neutral to substantive issues of environmental economics. Indeed, "critical engagement" rather than "neutrality" seems the more defensible position in SSK analyses (cf. Wynne, 1996b: 360).
29 In doing so, I independently reach conclusions not at all dissimilar to the ones reached by Casper Bruun Jensen (2005). I take this to confer some reliability to the points raised.

References

Aldred, J. and Jacobs, M. (2000) "Citizens and Wetlands: Evaluating the Ely Citizens' Jury," *Ecological Economics* 34(2): 217–32.

Asdal, K. (1998) *Knappe ressurcer? Økonomenes grep om miljofeltet* [Scarce Resources? Economists' Control of the Environmental Field]. Oslo: Universitetsforlaget.

Barns, I. (1996) "Manufacturing Consensus?: Reflections on the UK National Consensus Conference on Plant Biotechnology," *Science as Culture* 5(23): 199–217.

Barry, A. (2001) *Political Machines: Governing a Technological Society*. London and New York: The Athlone Press.

Barry, A. (2002) "The Anti-political Economy," *Economy and Society* 31(2): 268–84.

Brown, M.B., Lentsch, J. and Weingart, P. (2004) "Representation, Expertise and the German Parliament: A Comparison of Three Advisory Institutions," in S. Maasen and P. Weingart (eds) *Democratization of Expertise? Exploring Novel Forms of Scientific Advice in Political Decision-Making: The 2003 Yearbook of the Sociology of the Sciences*, forthcoming. Dordrecht: Kluwer Academic Publishers.

Bruun Jensen, C. (2005) "Citizen Projects and Consensus Building at the Danish Board of Technology: On Experiments in Democracy," *Acta Sociologica* 48(3): 221–35.

Callon, M. (1999) "The Role of Lay People in the Production and Dissemination of Scientific Knowledge," *Science, Technology and Society* 4(1): 81–94.

Campbell, B.L. (1985) "Uncertainty as Symbolic Action in Disputes among Experts," *Social Studies of Science* 15: 429–53.

Carolan, M.S. (2005) "Science, Reflexivity and the 'Distancing' of Nature: Toward a Pragmatic Assessment of Knowledge Claims," paper presented at the "Technonatures" workshop, 37th World Congress of the International Institute of Sociology, Stockholm, Sweden, 5–9 June.

Collins, H.M. and Evans, R. (2002) "The Third Wave of Science Studies: Studies of Expertise and Experience," *Social Studies of Science* 32(2): 235–96.

Corry, O. (2003) "Hinsides bæredygtig udvikling: Bjørn Lomborg og den ny miljopolitiske dagsorden" [Beyond Sustainable Development: Bjørn Lomborg and the New Environmental Agenda], *Politologiske Studier* 6(1): 86–102.

Danish Board of Technology (DBT) (2003a) *Pris på miljøet?* [Pricing the Environment?], Teknologirådets Rapporter 2003/2. Copenhagen: Teknologirådet.

Danish Board of Technology (DBT) (2003b) *Pris på miljøet? Borgerpanelets introduktionsmateriale* [Pricing the Environment? The Citizen Panel Introductory Material], ed. H.S. Madslund. Copenhagen: Teknologirådet.

Danish Board of Technology (DBT) (2003c) *Pris på miljøet? Projektbeskrivelse* [Pricing the Environment? Project Description]. Copenhagen: Teknologirådet. URL: http://www.tekno.dk (accessed July 2005).

Dryzek, J.S. (1997) *The Politics of the Earth: Environmental Discourses*. Oxford: Oxford University Press.

Dryzek, J.S. (2000) *Deliberative Democracy and Beyond: Liberals, Critics, Contestations*. Oxford: Oxford University Press.

Eckersley, R. (1999) "The Discourse Ethic and the Problem of Representing Nature," *Environmental Politics* 8(2): 24–49.

Einsiedel, E.F., Jelsoe, E. and Breck, T. (2001) "Publics at the Technology Table: The Consensus Conference in Denmark, Canada, and Australia," *Public Understanding of Science* 10(1): 83–98.

Elam, M. and Bertilsson, M. (2002) "Consuming, Engaging and Confronting Science: The Emerging Dimensions of Scientific Citizenship," STAGE Discussion Paper One. URL: http://www.stage-research.net/stage (accessed July 2005).

European Commission (2001) *Science and Society Action Plan*. Luxembourg: Office for Official Publications of the European Communities. URL: http://europa.eu.int/comm/research/science-society/pdf/ss_ap_en.pdf (accessed July 2005).

Fixdal, J. (1997) "Consensus Conferences as 'Extended Peer Groups,'" *Science and Public Policy* 24(6): 366–76.

Flyvbjerg, B. (1998) *Rationality and Power: Democracy in Practice*. Chicago: University of Chicago Press.

Funtowicz, S. and Ravetz, J.R. (1992) "Three Types of Risk Assessment and the Emergence of Post-normal Science," in S. Krimsky and D. Golding (eds) *Social Theories of Risk*, pp. 251–73. New York: Praeger.

Gibbons, M., Limoges, C., Nowotny, H., Schwartzman, S., Scott, P. and Trow, M. (1994) *The New Production of Knowledge*. London: SAGE Publications.

Goven, J. (2003) "Deploying the Consensus Conference in New Zealand: Democracy and De-problematization," *Public Understanding of Science* 12(4): 423–40.

Grove-White, R. (1997) "The Environmental 'Valuation' Controversy: Observations on its Recent History and Significance," in J. Foster (ed.) *Valuing Nature?*, pp. 21–31. London: Routledge.

Guston, D.H. (1999) "Evaluating the First U.S. Consensus Conference: The Impact of the Citizens' Panel on Telecommunications and the Future of Democracy," *Science, Technology, & Human Values* 24(4): 451–82.

Haas, P.M. (1992) "Introduction: Epistemic Communities and International Policy Coordination," *International Organization* 46(1): 1–35.

Habermas, J. (1993) *Justification and Application: Remarks on Discourse Ethics*. Cambridge: Polity Press.

Hajer, M.A. (1995) *The Politics of Environmental Discourses: Ecological Modernization and the Policy Process*. Oxford: Oxford University Press.

Harremoüs, P., Gee, D., MacGarvin, M., Stirling, A., Keys, J., Wynne, B. and Vaz, S.G., eds. (2002) *The Precautionary Principle in the 20th Century: Late Lessons from Early Warnings*. London: Earthscan Publications.

Harste, G. (2003) *Videnskabsetik i risikosamfundet* [Scientific Ethics in the Risk Society]. Aarhus Universitet: Institut for Statskundskab.

Irwin, A. (2001) "Constructing the Scientific Citizen: Science and Democracy in the Biosciences," *Public Understanding of Science* 10(1): 1–18.

Irwin, A. and Michael, M. (2003) *Science, Social Theory and Public Knowledge*. Maidenhead: Open University Press.

Jamison, A. (2003) "Remember Lysenko," *EASST Review* 22(2–3). URL: http://www.easst.net/review/dec2003/jamison (accessed November 2005).

Jamison, A. (2004) "Learning from Lomborg: Or Where Do Anti-environmentalists Come From?," *Science as Culture* 13(2): 173–95.

Jasanoff, S. (1990) *The Fifth Branch: Science Advisers as Policymakers*. Cambridge, MA: Harvard University Press.

Jasanoff, S. (1996) "Beyond Epistemology: Relativism and Engagement in the Politics of Science," *Social Studies of Science* 26: 393–418.

Jasanoff, S. (2003) "Technologies of Humility: Citizen Participation in Governing Science," *Minerva* 41: 223–44.

Joss, S. (1998) "Danish Consensus Conferences as a Model of Participatory Technology Assessment: An Impact Study of Consensus Conferences on Danish Parliament and Danish Public Debate," *Science and Public Policy* 25(1): 2–22.

Keat, R. and Urry, J. (1982) "Values, Theory and Reality," in R. Keat and J. Urry (eds) *Social Theory as Science*, pp. 13–31. London: Routledge.

Latour, B. (1987) *Science in Action*. Cambridge, MA: Harvard University Press.

Latour, B. (1993) *We Have Never Been Modern*. Hemel Hempstead: Prentice Hall.

Latour, B. (2004) *Politics of Nature: How to Bring the Sciences into Democracy*. Cambridge, MA: Harvard University Press.

Maranta, A., Guggenheim, M., Gisler, P. and Pohl, C. (2003) "The Reality of Experts and the Imagined Lay Person," *Acta Sociologica* 46(2): 150–65.

Marris, C. and Joly, P.-B. (1999) "Between Consensus and Citizens: Public Participation in Technology Assessment in France," *Science Studies* 12(2): 3–32.

Miller, P. and Rose, N. (1990) "Governing Economic Life," *Economy and Society* 19(1): 1–31.

Mohr, A. (2002) "A New Policy-Making Instrument? The First Australian Consensus Conference," Doctoral Thesis, School of Humanities, Faculty of Arts, Griffith University.

O'Neill, J. (1993) *Ecology, Policy and Politics: Human Well-being and the Natural World*. London: Routledge.

O'Neill, J. (2007) *Markets, Deliberation and Environmental Value*. London: Routledge.

Paavola, J. and Bromley, D.W. (2002) "Contested Choices," in D.W. Bromley and J. Paavola (eds) *Economics, Ethics, and Environmental Policy*, pp. 3–12. Oxford: Blackwell.

Pellizzoni, L. (1999) "Reflexive Modernization and Beyond: Knowledge and Value in the Politics of Environment and Technology," *Theory, Culture and Society* 16(4): 99–125.

Pellizzoni, L. (2001) "The Myth of the Best Argument: Power, Deliberation and Reason," *British Journal of Sociology* 52(1): 59–86.

Pellizzoni, L. (2003) "Knowledge, Uncertainty and the Transformation of the Public Sphere," *European Journal of Social Theory* 6(3): 327–55.

Porter, T.M. (1995) *Trust in Numbers: The Pursuit of Objectivity in Science and Public Life*. Princeton: Princeton University Press.

Purdue, D. (1996) "Contested Expertise: Plant Biotechnology and Social Movements," *Science as Culture* 5(25): 527–45.

Purdue, D. (1999) "Experiments in the Governance of Biotechnology: A Case Study of the UK National Consensus Conference," *New Genetics and Society* 18(1): 79–99.

Rowe, G. and Frewer, L.J. (2000) "Public Participation Methods: A Framework for Evaluation," *Science, Technology, & Human Values* 25(1): 3–29.

Rowe, G. and Frewer, L.J. (2005) "A Typology of Public Engagement Mechanisms," *Science, Technology, & Human Values* 30(2): 251–90.

Rowe, G., March, R. and Frewer, L.J. (2004) "Evaluation of a Deliberative Conference," *Science, Technology, & Human Values* 29(1): 88–121.

Sagoff, M. (1988) *The Economy of the Earth: Philosophy, Law, and the Environment*. Cambridge: Cambridge University Press.

Shapin, S. (1995) "Cordelia's Love: Credibility and the Social Studies of Science," *Perspectives on Science* 3(3): 255–75.

Siu, L.L.-S. (2002) "Tibetan Antelopes molten into Plastic Gloves—Environmental Economics, Knowledge Rivalry and Blackboxes," *Social Studies of Finance Working Papers*. Edinburgh: University of Edinburgh.

Smith, G. (2003) *Deliberative Democracy and the Environment*. London: Routledge.

Turner, S.P. (2003) *Liberal Democracy 3.0*. London: SAGE Publications.

Van der Sluijs, J., van Eiijndhoven, J., Shackley, S. and Wynne, B. (1998) "Anchoring Devices in Science for Policy: The Case of Consensus around Climate Sensitivity," *Social Studies of Science* 28(2): 291–323.

Whiteside, K.H. (2002) *Divided Natures: French Contributions to Political Ecology*. Cambridge, MA: MIT Press.

Wynne, B. (1996a) "Misunderstood Misunderstandings: Social Identities and Public Uptake of Science," in A. Irwin and B. Wynne (eds) *Misunderstanding Science?: The Public Reconstruction of Science and Technology*, pp. 19–46. Cambridge: Cambridge University Press.

Wynne, B. (1996b) "SSK's Identity Parade: Signing-Up, Off-and-On," *Social Studies of Science* 26: 357–91.

Wynne, B. (2005) "Risk as Globalizing 'Democratic' Discourse? Framing Subjects and Citizens," in M. Leach, I. Scoones and B. Wynne (eds) *Science and Citizens*, pp. 66–82. London: Zed Books.

Yonay, Y.P. (1994) "When Black Boxes Clash: Competing Ideas of What Science Is in Economics, 1924–39," *Social Studies of Science* 24: 39–80.

Yonay, Y.P. (1998) *The Struggle Over the Soul of Economics*. Princeton: Princeton University Press.

Åkerman, M. (2003) "What Does 'Natural Capital' Do? The Role of Metaphor in Economic Understanding of the Environment," *Environmental Values* 12: 431–48.

Author

Anders Blok is a PhD student in the Department of Sociology, Copenhagen University, Denmark. His PhD project deals with the knowledge politics of global environmental governance, and his academic background is in political and environmental sociology. Previous work has mainly been in the sociology of risk, comparing lay and expert risk perceptions, knowledges and self-identities. He has worked as Research Assistant at the Danish Environmental Research Institute, and held a position as Visiting Researcher at Tohoku University, Japan, with a project on knowledge and politics in Japanese whaling. **Correspondence**: Department of Sociology, Copenhagen University, Øster Farigmagsgade 5, Box 2099, 1014 København K, Denmark; email: blok@hotmail.com