Beyond Speaking Truth? Institutional Responses to Uncertainty in Scientific Governance

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Elitist, technical, and positivist models of scientific governance have been subject to much scrutiny and criticism by science and technology studies (STS) for many years. Seminal work in STS has exposed the boundary work through which the distinctions between science and nonscience, science and politics, and experts and lay people are constructed and maintained (to mention only a few: Gieryn 1999; Latour 1993; Nowotny, Scott, and Gibbons 2001). A more specific tradition in STS has focused on the relations between science, technology, public policy, government and civil society, and has articulated demands for the acknowledgment of uncertainty and a self-critical stance toward scientific truth claims (Wynne 1993; Collins and Evans 2007), for a broader participation of citizens or lay people

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(Frankenfeld 1992; Joss 2002; Rowe and Frewer 2000 and 2005), and for heightened institutional reflexivity in science and scientific governance (Functowicz and Ravetz 1992; Jasanoff 1994; Leach, Scoones and Wynne 2005; Maasen and Weingart 2005; Beck 2008). However, a number of recent phenomena indicate that at least some of these points, in some institutional contexts, have been acknowledged and that scientific governance has undergone significant transformations, which require a new analytical perspective. In this issue, we explore the argument that scientific governance has begun to move beyond the idea of science speaking "truth to power" (Wildavsky 1979) and is developing institutional responses to the existing plurality of scientific and normative viewpoints, and more sophisticated accommodations of uncertainty in many issue areas. This does not mean that the old elitist, technical, and positivist models have been replaced by something completely new. There are important continuities that need to be exposed and addressed (Beck and Lau 2005). However, we hold that STS needs to develop new critical perspectives appropriate to a changing situation and ground its analyses in a more differentiated assessment of the institutions and discourses of scientific governance that deal with uncertainty and ambivalence. This volume sets itself the task of empirically exploring the concomitance of continuities and change and the complex and hybrid forms of scientific governance that are emerging in policy areas such as agriculture, biotechnology, biomedicine, and other controversial issue areas such as mobile phone masts and mobile phone radiation. The articles in this volume show that reflexivity, albeit in a limited and at times ambiguous or inconsistent manner, has begun to be incorporated into scientific governance. Investigating the extent of its incorporation, the different forms it takes, and the specific contexts in which it occurs or does not occur is the central aim of these contributions.

Scientific knowledge and scientific progress are, not only in the Western world, considered a fundamental resource of wealth, productivity, and public health and a decisive precondition for economic, technological, and even social and cultural development (Neidhardt et al. 2008). Scientific knowledge has become an important point of reference for decision making from the personal to the political level. Scientific expertise is considered indispensable when it comes to decision making on questions of nutrition, health and illness, agriculture and climate change, reproductive medicine, or the use of mobile phones. At the same time, the idea that science and technology generate not only new knowledge but also new risks, threats, and uncertainties (Beck 1992, 2008) has become almost a truism. There are good reasons to doubt that an increase in scientific knowledge will automatically

lead to better solutions for the pressing problems facing modern societies (Jasanoff 1994, 2004; Beck and Lau 2005; Maasen and Weingart 2005; Beck 2008). Policy makers as well as citizens and publics are confronted with the phenomenon that the increase in scientific knowledge and technical know-how brings about a corresponding increase in the range of viewpoints, evaluative perspectives, possible risks and dangers, and even possible unknowns (Trute 2005; Falk et al. 2006; Collins and Evans 2007). In many issue areas, such as genetic testing, genetically modified crops, nuclear energy, or mobile phones, a vast array of scientific experts has been mobilized to investigate, discuss, and assess the risks and benefits at stake and yet all this analysis, discussion, and assessment has not made the issues less contentious (Levidow 1998, 1999; Callon, Lascoumes, and Barthe 2001). Furthermore, nobody can seriously claim to know whether embryonic stem cell research will yield the therapeutic benefits researchers hope for in the future, whether alternative research strategies such as research on so-called induced pluripotent stem cells will prove more successful, and what the social and ethical implications of the latter might be. These issue areas and their attendant contestations provide a vivid demonstration of what it means to say that we live an ''age of uncertainty'' (Nowotny et al. 2001) or even ''radical uncertainty'' (Hajer and Wagenaar 2003). Under these conditions, policy makers cannot simply rely on the availability of something like the ''appropriate knowledge for policy'' because the knowledge foundation for decision making is marked by uncertainty (Functowicz and Ravetz 1992; Maasen and Weingart 2005). Science and scientific expertise have lost their reputation as providers of objective and unbiased knowledge that lies outside of interests and power configurations and escapes moral and social influences. Adherence to scientific knowledge, then, is ''no longer a credible policymaking strategy'' (Hajer and Wagenaar 2003, 10). Political decision makers consequently feel that they cannot safely bank on the authority of science as an effective way of closing down policy issues and debates (Jasanoff 1994; Falk et al. 2006).

In addition to scientific uncertainty, in many issue areas, the values that might guide political decision making, such as ''autonomy,'' ''well-being,'' ''security,'' or ''dignity,'' are themselves subject to interpretive uncertainty and contestation. In short, uncertainty affects both factual and normative questions. To make things more complicated, STS research has given us good reason to doubt the claim that ''facts'' can be cleanly separated from ''values,'' and that scientific expertise as such can be value free (Gieryn 1999; Trute 2005; Collins and Evans 2007; Douglas 2009). In addition, if risk assessment and scientific expertise cannot be neutral, then, by

extension, a problem-solving strategy that starts by "getting the facts right" cannot be neutral. Following this analysis, the controversies over nuclear energy, genetic testing, reproductive medicine, xenotransplantation, and genetically modified organisms (GMOs), to name only a few, appear essentially to be struggles over whether to interpret the issues as questions that could be settled by ever more accurate scientific risk assessment. Many STS scholars have thus argued that the risk frame is in itself reductionist and misses out important issues such as issues of social control, power, social inequality, the societal order at large (Levidow 1998; Wynne 1996, 2001), or our relation to animals and the nonhuman world (Haraway 1997).

Under these conditions of uncertainty, discourses have evolved over the past three decades that problematize not only particular substantive technologies or fields of research but also the relations between science, politics, and society more generally. Scholars such as Peter Wehling (2004) and Stefan Böschen (2005) observe the rise of a "reflexive governance of knowledge," in which debate and contestation characterize not only the production, regulation, or application of certain areas of scientific knowledge, but also, crucially, the ideas and institutions that structure those debates. This happened, for example, when the National Ethics Council that was set up by the German government in 2001 to structure public discourse on issues of biomedicine came under fierce attack in the media and in civil society in Germany for serving merely as the Chancellor's instrument to secure public consent to ready-made political decisions. The debate, which until then had focused on pre-implantation diagnosis and embryo research, turned into a debate on the institutional design of the Council, the appropriate status of experts and citizens in biomedicine policy in general, and the meaning of "ethics" and its proper relation to politics (Braun 2005). Similarly, the "participatory turn" in scientific governance could be understood at a more general level as forming an institutional response to problematizations of the forms of interaction between science, politics, and society. The fact that governments and scientific institutions have experimented with forms of public involvement, engagement, and participation can be understood as a response to the perception that the existing relations between science, society, and politics have become problematic. However, such participatory arrangements have themselves been challenged and problematized, not only in the STS literature (Lengwiler 2008) but also by actors themselves.[1] The present issue will, among other things, explore the extent to which reflexivity and an orientation toward dialogue with the public are incorporated in science–policy interfaces. It will further explore how far some fundamental conceptual distinctions on which the relations

between science, politics, and society have been based, such as the opposition between "facts" and "values," between "experts" and "lay people," or between "scientific knowledge" and other forms of knowledge, have become a matter of contestation, interpretation, and negotiation rather than being accepted simply as given (Wynne 1996b; Latour 2004). Certainly, these distinctions have not become meaningless in scientific governance. However, we think it is safe to say that these binary oppositions have started to become problematic not only in STS but also in scientific governance today. The central aim of the present issue is to investigate the extent to which reflexivity has begun to be incorporated into scientific governance, the different forms it takes, the specific contexts and levels at which it occurs, and the contexts in which it does not occur. We understand "scientific governance" in a deliberately generic way here. Following Alan Irwin (2006), we conceive of scientific governance as encompassing both the government of science, in the sense of steering, ordering, regulating, and overseeing technoscientific development, *and* the government of science–society relations, in the sense of designing, debating, and redesigning the forms and fora, institutions and practices of interactions between science, civil society, publics, and politics. To take it still further, we invoke the double meaning of the term, reading it as referring not only to the governance *of* science (and science–society relations) but also to governance *through* science, as for instance in the use of scientific policy advice. We believe that applying such a broad concept of scientific governance has advantages compared with the more specific, restricted concept of "knowledge politics," as coined by Nico Stehr (2005), which refers only to the regulation of new, contested scientific knowledge. If we understand and explore scientific governance in this broader sense, we can recognize occurrences of reflexivity, in the sense of processes of problematizing and challenging the ideas and institutions that structure the debate, to different degrees and in varying forms throughout research policy, science and society relations, and scientific policy advice.

In a normative, emphatic understanding, reflexivity has been conceptualized as the ability to realize one's own weaknesses, limits, and blind spots. Ideally, as Brian Wynne puts it, scientific governance would be based on a new institutional reflexivity (Wynne 1993) characterized by the ability of institutions to self-critically review their own prior, tacit commitments, such as commitments to visions of control and technological fix, economic competitiveness, or the idea that technoscientific innovation as such will induce social progress. Such institutional reflexivity in scientific governance would aim to integrate extrascientific actors,

forms of knowledge and perspectives, and be open to dissent and a plurality of viewpoints. However, one can also take the more detached stance of governmentality studies and see reflexivity not as necessarily destabilizing power relations but rather as a preoccupation of governance with itself, as processes of debating debate and governing governance mechanisms (Dean 1999). From this perspective, the inclusion of "ethical concerns," the recognition of plural viewpoints, or practices of "engaging the public" do not per se challenge prior commitments to the imperatives of technoscientific progress and economic competitiveness (see Braun, Moore, Herrmann and Könninger in this issue). They could also form more refined mechanisms of managing dissent through desubstantializing policy controversies.

The articles brought together in this special issue explore recent transformations in scientific governance. They ask about the way in which institutions of scientific governance have responded to scientific uncertainty and contested normative foundations. What, if any, are the institutional responses to the problematization of a relation between science and politics in which science provides facts and politics deliberate values? Where do we stand in terms of reflexive scientific governance? Where and when has reflexivity been incorporated into the practices and institutions of scientific governance? In which form, with which kind of reflexivity, and with which implications?

Although much has been said in STS about shifting or eroding boundaries between science and politics, relatively little is known about how the problematization of the underlying dichotomies plays out in scientific governance in practice today. This question can only be answered by detailed empirical research. This special issue brings together a number of studies that have investigated these questions on an empirical level. Each looks into a different area of scientific governance, examining closely how actors and institutions deal with a situation characterized by a plurality of viewpoints, contested truth claims, conflicting values, and the problematization of unquestioned expertise (Collins and Evans 2007). What comes out very clearly throughout the following case studies is that, first, *the expectation* that scientific expertise will provide reliable, objective, *true* knowledge and thereby close down policy controversies is gone. Political decision making takes place in the absence of this expectation. Institutions of scientific governance have accepted the existence of dissent and a plurality of viewpoints as a fact of life and have adopted mechanisms to deal with it. Second, the case studies show that although scientific knowledge and expertise are still ascribed a special authority in many ways, the authority of science cannot

and does not stand alone. Scientific expertise today is accompanied by a range of supplements such as ethics committees, public debate, lay persons, or the precautionary principle, meant to supervise, contain, or balance its power. Political decision makers are expected to pay tribute to these supplements. How they do this and what difference it makes is certainly variable, and this will be one focus of the following investigations. However, politics cannot afford to ignore these supplements to scientific expertise.

If the overarching question of the special issue is whether reflections on the limits of scientific knowledge and the plurality of normative and scientific viewpoints have been incorporated into scientific governance today, the answer would be "yes, but." The articles in this volume show that some form of reflexivity in this sense can be found in all the different areas of scientific governance under study. However, they also point out that such reflexivity has its limits and sometimes even dark sides and ambiguities. In some cases, it is restricted to certain institutional constellations (see the articles by Kropp and Wagner; Petersen, Heinrichs and Peters; and Bogner and Menz), or certain levels, for instance informal levels, of science–policy interactions. In others, it is realized only half-heartedly, competing with the persisting dominance of more control-oriented approaches (see the article by Böschen, Kastenhofer, Rust, Soentgen, and Wehling), and in further cases it might implicate its own ambiguities in that it sets a discursive framework that forecloses more fundamental forms of dissent (see the article by Braun, Moore, Herrmann and Könninger).

Cordula Kropp and Jost Wagner on "Knowledge on stage: institutional conditions for the use of scientific knowledge in science policy consulting" explore the interactions between scientific experts and policy makers in agricultural policy in Germany. The authors specifically examine the processes of knowledge transfer from agricultural science to political decision making and the different expectations of policy makers, scientific experts, and the public with regard to policy advice and knowledge transfer. Specifically, the article analyses what is considered to be "usable knowledge" in this sector, by whom, according to which criteria, and under which institutional conditions. Agricultural policy is a sector that has come under heavy public pressure in the recent decade due to a series of scandals, concerns about environmental and health risks, and public controversies on the basic values that should guide policy making in this area altogether. The study poses the question whether under these circumstances opportunities have evolved for developing a reflexive, dialogue-centered knowledge exchange between scientific experts and agropolitical decision makers that would be sensitive to uncertainties and possible risks

and side effects. The study shows that there is a potential for developing such reflexive forms of dialogue but that the chances to realize them depend on certain institutional constellations. They show that certain stages of the policy process are more amenable to incorporate reflexive discussions on different perspectives and potentially undesirable consequences than others. The authors also show that dialogue is not necessarily homologous with reflexivity; although some stages of the policy process require dialogical forms of interaction between science and politics, they provide less room for reflexivity. Successful processes of science policy advice, it emerges from this study, however, can lead to the interactive production of what the authors term scientifically framed, politically viable *orientational knowledge*.

In their article on "Scientific expertise in the mass media as informal policy advice," Imme Petersen, Harald Heinrichs, and Hans Peter Peters also investigate transformations in scientific policy advice, however in a different context, namely in relation to the mass media. In contemporary modern societies, the article argues, we see an increasing mass mediatization of science. This development deeply affects the ways in which policy makers refer to scientific expertise. Political decision makers, the authors show, are confronted with the fact that scientific knowledge is increasingly present in the mass media; scientists increasingly appear on the stage of the media. Science has gone public and policy makers have to take this fact into account. As they are still expected to base policy making on scientific knowledge, policy makers cannot afford to ignore scientific knowledge publicized in the media. For the same reason, they have to respond to science controversies in the media. Thus, scientific expertise that appears in the mass media is not just observed by political decision makers but effectively enters the policy-making process. Mass-mediated expertise has therefore altered the established relations between scientific policy advisors and political decision makers. It operates, as the article shows, as informal policy advice complementing institutionalized advisory arrangements.

Stefan Böschen, Karen Kastenhofer, Ina Rust, Jens Soentgen, and Peter Wehling, in "Scientific non-knowledge and its political dynamics. The cases of agrobiotechnology and mobile phoning," investigate institutional responses in scientific governance to an augmented degree of uncertainty, namely ignorance or, as the authors term it, nonknowledge. The authors suggest distinguishing between different "cultures of nonknowledge" that determine social and political conflicts over the unknowns in scientific governance. They discern three such cultures: a control-oriented, a complexity-oriented, and a single-case–oriented culture. They make the case that all

three cultures have their strengths and weaknesses and are of equal validity. Drawing on a study on agrobiotechnology and mobile phones, the article shows that nonknowledge has increasingly been reflected on in policy making and public debate in recent years. The past decade, the authors argue, has seen the pluralization and politicization of nonknowledge due to the diversity of both scientific disciplines and social actors involved into risk discourses and conflicts. Against this background, the EU guideline 18/2001 concerning the release of GMOs and its orientation toward the precautionary principle can be understood as an institutional response to the politicization of the unknown in scientific governance. However, although there is an appreciation of nonknowledge in principle, the study also finds that institutional responses to the politicization of the unknown still tend to privilege a control-oriented approach. Thus, nonknowledge is a contested concept, and the authors show that we find different, often competing understandings both in the public and within science of what is unknown, what "unknown" actually means, and what the appropriate (institutional) way to address the unknown would be.

The precautionary principle, as a way of dealing with unknown effects and implications of new scientific and technological developments can be understood as one of a range of supplements that have been invented in the past two or three decades to control or balance the power of science. National ethics commissions, designed to give policy advice on controversial matters of biomedical and biotechnological developments, are certainly another such supplement. Alexander Bogner and Wolfgang Menz in "How politics deals with expert dissent—the case of ethics councils" study the phenomenon that science and technology conflicts are increasingly being dealt with in terms of ethics. The article looks into the institutional design and the work of national ethics commissions in Austria and Germany and finds that these expert commissions regularly provide heterogeneous political recommendations. Dissent among experts is the rule rather than the exception in this context. Policy makers thus regularly have to deal with a plurality of diverging expert recommendations—which does not seem to pose major challenges to the policy-making process though. Apparently, expertise is not even expected to deliver "truth" any more in this context. Expert dissent, the authors show, rather provides political decision makers with a range of available rationales for the respective course of action they wish to take.

In "The politics of proper talk: governmental ethics regimes between the technological model and reflexive government," Kathrin Braun, Alfred Moore, Svea Luise Herrmann, and Sabine Könninger understand national

ethics councils or commissions as "governmental ethics regimes." Based on a study on the development and operating principles of national bioethics bodies in Germany, France, and the United Kingdom since the 1980s, the article examines the question of whether and in which sense the type of policy advice provided by governmental bioethics bodies has departed from the old, technical model of policy advice based on the idea of science "speaking truth to power." The answer, again, is "yes, but." The article shows that governmental ethics regimes have incorporated features that go beyond technologies of prediction and control but that the overcoming of the technical model also bears some ambivalences. It refers to the concept of "reflexive government" as developed in governmentality studies and argues that governmental ethics regimes can be understood as a form of reflexive government in which inclusion, involvement, and mobilization of extrascientific actors and perspectives are built into a discursive and institutional framework that stabilizes rather than destabilizes the commitment to technoscientific progress and economic competitiveness.

The articles in this volume point at the necessity to adapt critical STS perspectives to the changed situation in scientific governance and to come to terms with the chances, limits, and ambiguities of scientific governance "beyond truth." Further empirical work is needed to establish whether and how this trend spells out in different institutional and cultural contexts.

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References

Beck, U. 1992. *The risk society. Towards a new modernity*. London: SAGE.

Beck, U. 2008. *World at risk*. Cambridge: Polity Press.

Beck, U., and C. Lau. 2005. Second modernity as a research agenda: theoretical and empirical explorations in the 'meta-change' of modern society. *British Journal of Sociology* 56:525-57.

Böschen, St. 2005. Reflexive Wissenspolitik: Zur Formierung und Strukturierung von Gestaltungsöffentlichkeiten. In Wozu Experten?, eds. Bogner, Alexander/ Torgersen, Helge, 241-63. Wiesbaden: VS Verlag.

Braun, K. 2005. Not just for experts. The public debate on reprogenetics in Germany. *Hastings Center Report* 35 (3):42-9.

Callon, M., P. Lascoumes, and J. Barthe. 2001. *Agir dans un monde uncertain. Essay sur la démocratie technique*. Paris: Seuil.

Collins, H., and R. Evans. 2007. *Rethinking expertise*. Chicago: The University of Chicago Press.

Dean, M. 1999. *Governmentality. Power and rule in modern society*. London: SAGE.

Douglas, H. 2009. *Science, policy, and the value-free ideal*. Pittsburgh, PA: University of Pittsburgh Press.

Falk, S., A. Römmele, et al., eds. 2006. *Handbuch Politikberatung*. Wiesbaden: VS Verl. für Sozialwissenschaften.

Frankenfeld, Ph. 1992. Technological citizenship: A normative framework for risk studies. *Science, Technology, & Human Values* V17 (4):459-84.

Functowicz, S. O., and J. R. Ravetz. 1992. Three types of risk assessment and the emergence of post-normal science. In *Social theories of risk*, ed. S. Krimsky and D. Golding, 251-74. Westport: Praeger.

Gieryn, Th. F. 1999. *Cultural boundaries of science: Credibility on the line*. Chicago: University of Chicago Press.

Hajer, M. A., and H. Wagenaar, eds. 2003. *Deliberative policy analysis. Understanding governance in the network society*. Cambridge, UK: Cambridge University Press.

Haraway, D. J. 1997. *Modest Witness@Second Millennium. FemaleMan Meets OncoMouse: Feminism and technoscience*. London: Routledge.

Irwin, A. 2006. The politics of talk: Coming to terms with the "new" scientific governance. *Social Studies of Science* 63 (2):299-320.

Jasanoff, S. 1994. *The fifth branch. Science advisers as policymakers*. Cambridge, MA: Harvard University Press.

Jasanoff, S. 2004. *States of knowledge: The co-production of science and the social order*. London: Routledge.

Joss, S. 2002. Toward the public sphere—Reflections on the development of participatory technology assessment.". *Bulletin of Science, Technology & Society* 22: 220-31.

Latour, B. 1993. *We have never been modern*. Harvard: Harvard University Press.

Leach, M., I. Scoones, and B. Wynne, eds. 2005. *Science and citizens, globalization and the challenge of engagement*. London/New York: Zed Books.

Lengwiler, M. 2008. Participatory approaches in science and technology. Historical origins and current practices in critical perspective. *Science, Technology, & Human Values* 33 (2):186-200.

Levidow, L. 1998. Democratizing technology—Or technologizing democracy? Regulating agricultural biotechnology in Europe." *Technology in Society* 20: 211-26.

Levidow, L. 1999. Britain's biotechnology controversy: Elusive science, contested expertise. *New Genetics and Society* 18 (1):47-64.

Maasen, S., and P. Weingart, eds. 2005. *Democratization of expertise? Exploring novel forms of scientific advice in political decision-making*. Dordrecht: Springer.

Neidhardt, F., R. Mayntz, and et al. 2008. Wissensproduktion und Wissenstransfer. Zur Einleitung. In *Wissensproduktion und Wissenstransfer. Wissen im Spannungsfeld von Wissenschaft, Politik und Öffentlichkeit*, ed. Mayntz R., F. Neidhardt, P. Weingart and U. Wengenroth. Bielefeld: transcript.

Nowotny, H., P. Scott, and M. Gibbons. 2001. *Re-thinking science: Knowledge and the public in an age of uncertainty*. Cambridge, UK: Polity Press.

Rowe, G., and L. Frewer. 2000. Public participation methods: A framework for evaluation." *Science, Technology and Human Values* 25 (1):3-29.

Rowe, G., and L. J. Frewer. 2005. A typology of public engagement mechanisms. *Science, Technology, & Human Values* 30:251-90.

Stehr, N. 2005. *Knowledge politics: Governing the consequences of science and technology*. Boulder, CO: Paradigm Publishers.

Trute, H. -H. 2005. Democratising science: Expertise and participation in administrative decision-making. In *The public nature of science under assault. Politics, markets, science and the law*, ed. Nowotny, H., et al., 87-108. Berlin/Heidelberg: Springer.

Wehling, P. 2004. Reflexive Wissenspolitik: Öffnung und Erweiterung eines neuen Politikfeldes. Technikfolgenabschätzung. *Theorie und Praxis* 13 (3):63-71.

Wildavsky, A. 1979. *Speaking Truth to Power*: *The Art and Craft of Policy Analysis*. Boston: Little, Brown and Company.

Wynne, B. 1993. Public uptake of science: A case for institutional reflexivity. *Public Understanding of Science* 2 (4):321-37.

Wynne, B. 1996. May the sheep safely graze? A reflexive view of the expert-lay knowledge divide. In *Risk, environment and modernity*, ed. S. Lash, et al., 44-83. London: SAGE.

Wynne, B. 2001. Creating public alienation: Expert cultures of risk and ethics on GMOs. *Science as Culture* 10:445-481.