

Introduction: Ambiguous Progress

Advisory and Regulatory Science between Uncertainty, Normative Disagreement and Policy-Making

Stefan Bösch (Universität Augsburg, stefan.boeschen@phil.uni-augsburg.de)

Peter Wehling (Universität Augsburg, p.wehling@t-online.de)

1 Scientific expertise and policy-making: a *liaison dangereuse*?

In an impressive and unprecedented manner, the emergence and establishment of global climate change politics in recent years highlights the practical relevance and political impact of science, but, at the same time, raises new and difficult problems of justifying scientific knowledge and legitimising the political role of science.¹ These problems mainly result from the fact that science-based expertise has increasingly become the fundament of world-wide political action in relevant technological and political areas (beside climate politics for instance agri-biotechnology, nanotechnology, or nuclear fusion energy) – irrespective of all its endemic uncertainties, ambiguities and knowledge gaps. This political and practical role of science and professional expertise is all the more surprising as in recent years it has become manifest in a number of social and political conflicts (on nuclear energy, agri-biotechnology, and the like)

¹ In what follows we use the term „science“ in a more encompassing sense (like the German „Wissenschaft“), thus including not only natural and engineering sciences but also social sciences and humanities (such as ethics).

that in contexts of practical application science usually is unable to offer reliable and consensual knowledge to guide political action in an unambiguous manner: Institutionalised expertise regularly is contested by counter-experts, the uncertainties and ignorance embedded in scientific knowledge are addressed and politicised by social movements, the media, or different epistemic cultures within the sciences (cf. Knorr-Cetina 1999; Jasanoff 2005; Hulme 2009; Bösch et al. 2010; Kaiser et al. 2010).

Thus, the growing public awareness of scientific uncertainties and “science-based ignorance” (Ravetz 1990) as well as the involvement of a plurality of contrasting epistemic cultures in social conflicts about technological risks result in a paradigm shift with regard to the perception of science (and technology) in contemporary societies: Science is no longer exclusively seen as an endeavor that produces and accumulates knowledge while at the same time repelling ignorance, but instead as an activity that *simultaneously* increases knowledge and ignorance (Ravetz 1986: 423). Given this background, the question arises how scientific expertise nevertheless can be constituted in a way that it becomes the decisive resource of policy-making

in many fields of action: How can, in spite of knowledge gaps and irreducible uncertainties, an at least provisional consent be achieved and justified which is both robust and specific enough to form the basis of coherent political programs and economic innovation strategies? Which conflicts are addressed and which ones are ignored? And what forms of “boundary work” can be observed?

As it is well known, in the case of climate research and politics a novel transnational institution, the Intergovernmental Panel on Climate Change (IPCC), has been established in order to deal with the tensions between scientific uncertainty on the one hand and the (presumed) urgency of globally coordinated political action on the other hand (cf. Beck 2009). While the IPCC is, of course, not denying uncertainty and ignorance, its main task can be seen in manufacturing zones of consent and certainty in order to substantiate the need as well as to specify the overall goals of urgent political action. Therefore the IPCC’s recent crisis of credibility triggered by mistakes in the Fourth Assessment Report is doubtless the most striking example of the epistemic and legitimacy risks inherent in strategies aiming at increasing the political impact of science by performing a more or less active management of consent which is necessarily accompanied by the marginalisation and exclusion of dissenters, the so called “climate sceptics”. Nevertheless, one should not overhastily dismiss such forms of boundary work given the fact that in a number of important issues, most prominently the correlation of smoking and cancer as well as global warming, the conscious fuelling of doubt about almost indisputable scientific evidence has convincingly been criticised as a questionable, interest-driven strategy employed by certain actors (above all the tobacco industry and mineral oil firms) in order to avoid targeted political regulation (see Proctor 1995; Proctor 2008; Oreskes/Conway 2010).

Surprisingly, however, both camps, the “manufacturers of consent” as well as the “merchants of doubt” (Oreskes/Conway 2010), equally continue to stick to the claim that policy-making should be based on complete, incontestable and unambiguous scientific knowledge. Obviously, this is a classical modernist and rationalist claim, drawing on Max Weber’s idea of “domination by virtue of knowledge” (*Herrschaft kraft Wissen*). While there is no doubt that this idea up to now is still highly influential,² one should also expect that in contemporary societies (which might be qualified as “reflexive modern”) there exist different strategies to solve the epistemic and legitimacy problems which confront advisory and regulatory science. Indeed, when we look at other areas of technology and innovation politics it seems that the (obviously risky) manufacturing of consent is not always the “magic formula” for science and professional expertise to gain legitimacy and political influence. Another strategy has emerged primarily around the establishment of ethics councils designed to deal with the implications and possible consequences of new biomedical technologies such as stem cell research, predictive genetic testing or preimplantation genetic diagnosis (PGD). While in this case, too, professional expertise seems to influence political decision-making, the impact on politics of ethical expert knowledge appears to be more complex and contingent: as it seems with regard to ethically contested issues, it is *dissent* rather than consent that provides both expertise and policy-making with legitimacy and support by the public (Bogner/Menz 2010). To put it more precisely, what generates social and political legitimacy is not dissent as such but a sort of “regulated” dissent

² A case in point is the appeal to „sound science” in the debates on the risks of genetically modified organisms (GMOs). “Sound science” is expected to provide indubitable knowledge of whether or not GMOs pose any ecological or health risks.

which reduces the vast variety of ethical and political views on biopolitical issues to a limited number of contrasting, yet equally “acceptable” ethical argumentations while excluding more “radical” positions (see Braun et al. 2010; Hedgecoe 2010). However, apart from the fact that this outcome of expert advice might foster a questionable political decisionism that uses diverging expert views as a rationale for one-sided, interest-based decision-making, there is little doubt that disagreement as the result of scientific advice is not always instrumental in policy-making and will of course not always be accepted by political actors and/or the public.

Recently, Roger Pielke jr. (2007; 2010) has developed an inspiring framework for analysing the different roles of scientific experts in decision-making. He identifies four such roles: First, the “Pure Scientist” seeks to focus exclusively on what is supposed to be “facts” and has no interaction with decision-makers. Second, the “Science Arbiter” only answers to narrow factual questions asked by decision-makers. Thirdly, the “Issue Advocate” promotes a specified view on a certain issue and thus seeks to reduce the scope of choices available to the decision-maker. Fourthly, the “Honest Broker of Policy Options” strives to expand the scope of choices available to the decision-maker and to clarify the possible consequences of each option (Pielke 2010: 171). This differentiation appears to be heuristically helpful also with regard to the question of how advisory and regulatory sciences deal with the epistemic and legitimacy problems resulting from the tensions between uncertainty, normative ambiguity and the need for targeted political activity. Apparently, the strategy of manufacturing scientific consent as employed by the IPCC and other advisory or regulatory bodies is quite close to what Pielke terms “issue advocacy”, with all the risks inherent in this type of expert advice (see Pielke 2010: 179–82). By contrast, the prefer-

ence for dissent might at first sight resemble the figure of the “honest broker”, since disagreement between experts seems to expand, or at least not to reduce, the scope of choice available to policy-makers. However, merely stating dissent is not necessarily tantamount to honest brokering since the latter, according to Pielke (2010: 182), “must focus not simply on creating relevant knowledge (a product), but also on making knowledge relevant (a process)”. Yet in this way, the honest broker, too, is engaged in elaborating policy options, and, although presenting several alternative options might foster democratic deliberation,³ it still assigns a prominent (and problematic) political role to scientists (see Brown 2008: 488). Therefore the honest broker is not simply exempt from those questions of legitimacy and representativeness which Pielke seems to pose to the issue advocates only: “Whose values do they represent? What is the basis for the authority granted to experts?” (Pielke 2010: 182) And, as we would like to add: How does the honest broker deal with scientific uncertainty and ignorance?

Thus, while Pielke seems to be sympathetic, tacitly at least, to the ideal-type of the honest broker we would suggest not to judge the respective roles of scientific experts *a priori* in normative terms but use them instead as heuristic tools for taking a closer look at the specific empirical contexts in which practically and politically relevant science operates. This is exactly what the papers in this thematic issue⁴ do with regard to some of the most contested (both scientifically and politically) are-

³ Yet it might also result in the blockade of political decision-making by powerful interest groups who can take advantage of what they strive to label scientific dissent or indecisiveness.

⁴ The majority of the papers in this issue were first presented at a meeting of the Section “Science and Technology Studies” of the German Sociological Association (DGS) held at the University of Augsburg in June 2008.

nas of technological innovation and policy-making: global warming and climate politics, the regulation of genetically modified organisms (GMOs), risk communication regarding food supplements, and bioethical expert advice institutionalised in national ethics councils: How is scientific knowledge constructed in these contexts, how is expertise organised, how are the problems of legitimacy addressed and resolved (or not), how do the experts deal with uncertainty, ignorance, ambiguity and dissent, how (if at all) is expert knowledge integrated in political decision-making, what relations of science to politics as well as to society emerge in the above-mentioned arenas of social conflict?

2 The contributions to this issue

With respect to the different types of scientific expertise and their political influence, Franz Seifert discusses in his paper "Back to politics at last" the transatlantic conflict over agro-biotechnology and the consequences for the EU politics about GMO. The central issue of his argumentation is the structure of conflicts that emerge when a specific form of risk assessment is set up as an implicitly normative standard to which the other ways of stating risks are compared. In this case, the "orthodox" standard is provided by the risk regulation procedures in the U.S. which are built on an ostensibly clear-cut separation of an "objective" and unambiguous scientific risk assessment on the one hand and political strategies of risk management on the other. Opposing to European restrictions to the importation of GMOs, the U.S. filed an ultimately successful lawsuit at the World Trade Organisation (WTO) against the EU position that had evolved against the background of the BSE crisis towards a generalisation of precautionary procedures. In the lawsuit at the WTO the EU commission was accused of a violation of international trade law, because the precautionary procedures to deal with uncertainties and ambiguities were inter-

preted as undue barriers of trade. Notwithstanding the fact that small EU countries like Austria continue to maintain a ban on the cultivation of GMOs, Seifert regards the outcome of the WTO dispute as indicative of the unbroken power of what he terms the "orthodox view" of the role of science in risk regulation.

In this case, science apparently is reduced, willingly or not, by political actors to the role of the "science arbiter" whose answers are held to be objective truths. If the sciences are seriously willing to escape such an instrumentalisation and help regain an open space for *political* deliberation and decision, they would have to consciously highlight the inherent uncertainties and "blind spots" of their knowledge – a self-reflective move that is not necessarily identical to "honest brokering".

Seifert traces back the power of the orthodox view to its intimate connection to international free trade legislation and therefore is highly sceptical of the prospects of an "unorthodox" view which accounts for the cultural relativity and intrinsic uncertainty of scientific knowledge.

Opposing to a view of transnational regimes as emerging around shared factual knowledge, Willy Viehöver argues in his paper "Governing the planetary greenhouse in spite of scientific uncertainty" that the global climate regime was established even without scientific consensus. Therefore, we need to understand how and why certain ideas (in this case the idea of human-induced global warming) acquire credibility and are institutionalised. Viehöver's argument follows the idea that the relatively successful institutionalisation of a global climate regime has been made possible through the evolution of a "narrative grammar of confidence" and corresponding "rituals of evidence". To underpin this idea he first conceives of the global warming story as a narrative in Paul Ricœur's sense and emphasises that such narratives constitute

societies' sociopolitical imaginaries including their horizons of expectations. Second, he analyses the building of a transnational climate regime as a process of ritual in the argumentative line of Victor Turner. Against this background, Viehöver offers a new perspective on the evolution of the global climate regime in three phases: a) a phase of separation (starting from the early 1970s) of human and "natural" influences on the global climate (agenda building 1970-90); b) a liminal phase (from 1990 until today) where the state of the ritual subject is highly ambiguous due to refiguring the familiar belief systems; and c) a post-liminal phase of re-aggregation (from now on). This reconceptualization allows us not only to detect how a new logic of institutional appropriateness has been configured and subsequently stabilised, but also to search for signals of the post-liminal stage and to address the question of which path of evolution and order for world-risk-societies (Beck 2010) will be chosen., Viehöver assumes the IPCC. to be the accredited guardian of climate related "truth games" since this institution has successfully installed a "grammar of confidence" – despite all "climategates" (cf. Reusswig/Lass this issue).

Fritz Reusswig and Wiebke Lass also focus on global climate politics. The main argument in their paper "Post-Carbon Ambivalences" is that there is a major shift from an "old" to a "new" climate change discourse, the latter starting with IPCC's Fourth Assessment Report. According to the authors, this fundamental discursive change can be deduced from a range of indicators. There is a change of the master frame – from earth system analysis to earth system management –, a change of the leading sciences – from natural sciences to economics and social sciences –, a change of the dominant risk perspective – from climate risks to socio-climatic risks – and other changes detailed in the paper. Now, the leading perspective is how to deal with the 'hybrid object' climate and

how to manage the above mentioned changes carefully. Since the human fingerprint seems to be indisputable, the structure of uncertainty is transformed. In the old climate change discourse uncertainty was produced by the contrasting views of natural scientists, in the new one uncertainty is mainly generated by problems of decision-making. Summarising this transformation, the new climate discourse is characterized by a situation of diverging discourse coalitions which try to define the relevant policy-aspects in their respective ways. This dynamics of different discourse coalitions fuels vivid climate debates and seems to support the narrowing of problem-solving activities to technological solutions. In combination with the IPCC crisis in 2009/2010 this specific situation leads to a broad debate about the organisational structure of the IPCC – and the necessities and opportunities of an institutional reform. Nevertheless, it remains a contested issue how to institutionalise adequate procedures to answer the scientific and political questions which are seamlessly intertwined in the climate debate.

In his paper "Let's disagree!", Alexander Bogner questions the still widespread assumption that only consent among experts affords legitimacy to both scientific expertise and policy-making. As he argues, this holds true only for those conflicts over science and technology that are understood as problems of *risk*. By contrast, in those conflicts that are framed in terms of *ethics* – mainly conflicts in the field of biomedicine and biotechnologies – dissent among the experts even becomes an indicator of quality as well as a source of legitimacy of the advisory process. Insofar as questions of value are addressed in debates on biomedical technologies such as stem cell research or genetic testing, irresolvable disagreement apparently is considered legitimate by the majority of social and political actors. According to Bogner, the increasing "ethicisation" of controversial issues has re-

markable and far-reaching implications for the role of expert-knowledge in political decision-making as well as for the governance of technologies in contemporary societies. As he illustrates using the example of debates over biomedical technologies and ethical advice in Germany, disagreement among experts does not determine political decision-making, but, on the other hand, it is precisely this dissent which first and foremost legitimises the political sphere's claim to autonomously decide. Thus, disagreement among ethical experts is far from being useless or dysfunctional for policy-making. The interesting question, then, remains according to which normative criteria and based on which scientific assumptions, political decisions on "ethicised" issues are actually taken.

Against the background of the theory of "reflexive modernization", Gerald Beck and Cordula Kropp ("Is science-based consumer advice prepared to deal with uncertainties in Second Modernity?") observe an important transformation of risk communication in contemporary societies. Due to the fact that expert advice is getting more and more disputed, there are also increasing difficulties to adequately inform consumers by means of risk communication. To address the challenges resulting from this situation, the authors identify different interface-roles of science which it is prompted to fulfil in boundary situations of risk management and risk communication. With respect to their basic assumption of a fundamental change in risk communication, Beck and Kropp argue that the "classical modern style" of communicating risks in science-based consumer advice is supplemented by a more "reflexive style". While the classical style is based on a paternalistic model of authoritatively instructing the consumers about what the best options and decisions are, the reflexive style is characterized by the goal of enabling citizens to draw their own decisions under conditions of uncertainty and ambiguity. To empirically

underline their argument, the authors discuss different offers of risk communication in the field of Dietary Supplement Safety. The effort of an interactive expertise-building which is offered by the tool of "risk cartography" illustrates the new direction of designing risk communication as a "two-line" process.

3 An ambiguous progress

The five papers collected in this thematic issue not only illuminate the variety and heterogeneity of constellations in which scientific expertise becomes politically and socially relevant, but also the diversity of fruitful social science approaches to these issues. In our view, they make clear that there is no "one best way" to deal with the epistemological and legitimacy problems arising from the increasingly close interactions of science with politics and policy-making. What is more important than to focus on one putatively preferable role model of scientific advice, is that policy-relevant science strives to continuously reflect upon and question its own impact on society and politics as well as the resulting repercussions for science itself. The manufacturing of consent, for instance, can become counterproductive, both for politics and science, when it fosters mistrust in scientific knowledge and thus unwillingly serves to undermine widely accepted political goals such as the protection of the global climate. The presentation of dissent in ethical advice tends to be problematic when it becomes an end in itself, or even a ritual, and comes along with the abstinence from serious argumentative dispute thus tacitly affirming the liberal assumption that biopolitical decision-making is merely a matter of *private* preferences and choice. Passing scientific uncertainty and ignorance on to the public may at first sight foster transparency and undermine paternalism and technocracy; yet, on the other hand, it might soon result in overstraining individual actors by confronting them with the task of balancing

one scientific statement against the other which might be entirely contradicting the former.

Only modernist views might still tend to conceive of the growing political relevance of scientific knowledge and expertise as a substantial progress towards more rational decision-making. By closer inspection, this progress turns out to be a highly ambiguous one. It is not simply the solution to the problems of uncertainty, ignorance and disagreement, but raises new and difficult problems of legitimacy and “truth” not only for society and democratic politics but also for science itself. Here, two implications for further research are particularly important: First, the specific dynamics of globalisation results in various encounters of different epistemic cultures as well as institutional cultures of risk and non-knowledge. Such encounters can support the emergence of new kinds of “truth games” and therefore open up opportunities of cultural and institutional innovation. This applies, partly at least, in the case of the IPCC and the institutionalised processes of learning within this framework of building up expertise for political decision-making. Simultaneously, however, such truth games tend to be selective with respect to specific forms of constructing and evaluating scientific knowledge (and non-knowledge). In the multilevel constellation of the WTO dispute over GMOs, for instance, the dominant concentration on the “orthodox view” of risk assessment could prevail over the legitimacy of the precautionary principle because the latter was held to result in “barriers of trade”.

Against this background, second, it seems to be obvious that not only the institutionalised architectures of decision-making have to be analysed with regard to their inherent and often implicit selectivity of utilising specific knowledge resources. In addition, the cultural and, in particular, institutional shaping of scientific knowledge itself has to be carefully observed. This al-

lows to get insights regarding the question of how the respective phenomena are modelled and the different forms of knowledge and non-knowledge are constructed and evaluated within different institutional contexts such as the IPCC, the WTO Dispute Jury, national ethics councils and so on. These two analytical perspectives might help to promote and inform further research into the intricate problems, both epistemological and legitimacy, of policy-relevant science which are addressed by the contributions to this thematic issue.

4 References

- Beck, S., 2009: *Das Klimaexperiment und der IPCC. Schnittstellen zwischen Wissenschaft und Politik in den internationalen Beziehungen*. Marburg: Metropolis.
- Beck, U., 2010: Climate for Change, or How to Create a Green Modernity? In: *Theory, Culture & Society* 27(2-3): 254-266.
- Böschen, S./Kastenhofer, K./Rust, I./Soentgen, J./Wehling, P., 2010: The Political Dynamics of Scientific Non-Knowledge In: *Science, Technology & Human Values* 35(6): 783-811.
- Bogner, A./Menz, W., 2010: How Politics Deals with Expert Dissent: the Case of Ethics Councils. In: *Science, Technology & Human Values* 35(6): 888-914.
- Braun, K./Herrmann, S. L./Könninger, S./Moore, A., 2010: Ethical Reflection Must Always be Measured. In: *Science, Technology & Human Values* 35(6), pp. 839-864.
- Brown, M., 2008: Review of Roger Pielke, Jr., *The Honest Broker. Making Sense of Science in Policy and Politics*. In: *Minerva* 46: 485-489.
- Hedgecoe, A., 2010: Bioethics and the Reinforcement of Socio-technical Expectations. In: *Social Studies of Science* 40(2): 163-186.
- Hulme, M., 2009: *Why we disagree about Climate Change. Understanding Controversy, Inaction and Opportunity*. Cambridge: Cambridge University Press.
- Jasanoff, S., 2005: *Designs on Nature*. Princeton: Princeton University Press.
- Kaiser, M./Kurath, M./Maasen, S./Rehmann-Sutter, Chr. (eds.), 2010: *Governing Future Technologies. Nanotechnology and the Rise of an Assessment Regime*. Dordrecht etc.: Springer.
- Knorr-Cetina, K., 1999: *Epistemic Cultures. How the Sciences make Knowledge*.

- Cambridge, MA: Harvard University Press.
- Oreskes, N./Conway, E., 2010: *Merchants of Doubt*. New York: Bloomsbury Press.
- Pielke, Jr., R., 2007: *The Honest Broker. Making Sense of Science in Policy and Politics*. Cambridge: Cambridge University Press.
- Pielke, Jr., R., 2010: Expert Advice and the Vast Sea of Knowledge. In: A. Bogner/K. Kastenhofer/H. Torgersen (eds.): *Inter- und Transdisziplinarität im Wandel?* Baden-Baden: Nomos: 169-187.
- Proctor, R. N., 1995: *Cancer Wars: How Politics Shapes What We Know and Don't Know About Cancer*. New York: BasicBooks.
- Proctor, Robert N., 2008: Agnotology: A Missing Term to Describe the Cultural Production of Ignorance (and Its Study). In: R.N. Proctor/L. Schiebinger (eds.): *Agnotology: The Making and Unmaking of Ignorance*. Stanford, CA: Stanford University Press: 1-33.
- Ravetz, J., 1986: Usable knowledge, usable ignorance. In: W. C. Clark/R. E. Munn (eds.): *Sustainable Development of the Biosphere*. Cambridge: Cambridge University Press: 415-432.
- Ravetz, J., 1990: *The Merger of Knowledge with Power: Essays in Critical Science*. London/New York: Mansell.