

BOOK REVIEW

Discerning Experts. The Practices of Scientific Assessment for Environmental Policy. M. Oppenheimer, N. Oreskes, D. Jamieson, K. Brysse, J. O'Reilly, M. Shindell, & M. Wazeck. 2019. The University of Chicago Press, Chicago, IL. 304 pp.

INTRODUCTION

Anyone interested in the role that science plays in “evidence-based decision making”, when it comes to environmental issues and what the last few decades have to teach us about this, will be interested in this book. In the growing literature on science and policy, *Discerning Experts* fills a quite specific niche and has a relatively narrow focus, while simultaneously raising and attempting to answer some rather deep questions with broad applications.

The book is a joint effort of scholars renowned in their respective fields: climate scientist, Michael Oppenheimer (Princeton), historian of science Naomi Oreskes (Harvard), philosopher of science Dale Jamieson (NYU), and four post-doctoral fellows. Their focus is a particular type of science: “assessment science”. Examples of this type discussed in this book are the complex, multi-disciplinary and inter-disciplinary, international, large-scale kind of applied science projects that span many years. Most people are familiar with this sort of work in the form of the Intergovernmental Panel on Climate Change (IPCC), with its Reports. Some readers of this journal might resist such attention to context, averring that “science is science”, no matter the context. Others might argue that reviews of past science such as the IPCC Reports contain should be distinguished from “pure” science research. The authors of this book contend that this distinction between review and research is less clear in reality; more importantly, they argue that major questions of scientific importance, both regarding content and method, were developed in the context of such assessments.

Assessments treated in this book

The book focusses on three major environmental assessments, reflecting the respective authors’ areas of expertise. Chapter Two addresses the US National Acid Precipitation Assessment Program

(NAPAP), which ran from 1980-1991. Canada's disagreements with how things were handled in the US over this issue are given some coverage, so those of us old enough to remember those disputes will find interest here. Chapter Three treats the national and international efforts to detect ozone depletion, especially above the Antarctic Circle, which began in the 1970s. These efforts first reached international levels of cooperation in the 1980s, and are still ongoing under the auspices of the World Meteorological Organization and UN Environmental Program. Chapter Four deals with various national and international collaborations that developed between 1981 and 2007, for predicting sea level rise resulting from melting of the Antarctic Ice Sheet, and the eventual inclusion of such work within the various Assessment Reports of the IPCC from 1990 onward.

The three assessment cases have some common features. First, they were big, involving hundreds of scientists. Second, they involved international collaborations. Third, they were long term, two or more decades, and fourth, they were expensive, costing tens to hundreds of millions of dollars. The three central chapters are preceded by Chapter One, a short history of US science as a source of "expert judgement" for policy decisions, which puts into historical relief the developments of assessment science over the last few decades. The book's final chapters reflect on the nature of the science/policy borders that evolved in the context of these assessment cases (Chapter Five), and on some central features of both the sociology and epistemology of science in the context of those cases (Chapter Six).

The book's historical sections

The book's central three chapters are largely descriptive history, with a focus on recording the experiences of practising scientists engaged in these assessments. The research for the book includes both extensive use of archival and published sources, as well as 47 interviews of 42 key scientists involved in these projects, conducted over the period 2009-11. As such it is an attempt at "reconstructing the deliberations of expert participants, who reach judgments about what is known and what is uncertain in the scientific and political context of their times" (ix). On one level, this is old-school history of science applied to relatively uncharted territory. The authors contend that the science undertaken in such assessment projects constitute examples of a late 20th century kind of science that is relatively unstudied by historians and philosophers of science. One of the goals of the book is

to spur those of us working in those fields to pay attention. This kind of science, the authors contend, constitutes "...a significant locus of scientific knowledge production [versus mere revision] and therefore is important to study along with fieldwork, laboratory practices, and other more familiar topics of sciences studies" (xi).

The central historical chapters are written in fairly accessible language and detail, showing the evolution of research paradigms over time and geographical context. These chapters are valuable as clear accounts of the scientific substance of the interdisciplinary scientific fields of research into acid rain, ozone depletion and ice-sheet melting/sea level rise modelling. As such, the book provides a briefer treatment than can be found in the few existing monographs covering these respective topics. Readers should note that the book has a decided emphasis on the US experience of, and contributions to, these fields. This is explained as a pragmatic choice due to the subject matter expertise of the authors.

Separating science from policy

However, the historical description has a point beyond this, for as its subtitle suggests, "environmental policy" is also a core focus of the book in a very precise sense explained in Chapter Five, "Patrolling the science/policy border". Assessments of the type studied here necessarily involve scientists and processes of scientific deliberation in unavoidably policy-oriented contexts. That is, the scientific reviews undertaken are intended to have policy implications. The authors argue that for those engaged in "assessment science" of this type, it is generally assumed by all participants that what makes an assessment "successful" is that it has a beneficial impact on policy and the consequent societal decisions. The 'science' itself is judged on standards that are inherently implicated in questions beyond the mere factual or truth-telling 'quality' of the science. That means that what makes an assessment "credible" depends on considerations that go beyond the normal canons of scientific rigour and quality used within the academy of scientific practice.

Can we separate science from policy?

This is what makes the field of assessment science so interesting for those concerned with the science-policy border. As is widely recognized in the literature regarding environmental assessments generally, there is an inescapably political rationale for the

scientific work done in assessment projects. It is inescapable because the science is always for determining directly political (or more loosely, 'policy') questions of what should be done. What good should be pursued by politically authorized bodies in the name of the public interest (however defined) based on that science? What science is still needed, and thus, what funds should be allocated in order to achieve this good through further science?

The archival and interview evidence indicated to the book's authors that scientists were quite conscious that the scientific evidence being amassed could be threatening to the economic priorities of respective countries. This continues to be true in the case of IPCC reports. The book challenges the contemporary currency of a clear cut distinction between science on the one hand, as a trusted source of judgements of fact about the world, and more dubious value judgements (roughly equated to 'policy') on the other hand. Examples include the inevitable decisions regarding what would be the right cut in ozone emissions of ozone-depleting substances that prove sufficient to protect both economic and environmental goals. These are scientific and policy decisions occurring simultaneously.

Chapter Five goes on to argue, on the basis of the evidence of preceding chapters, that "in the practice of assessment, there are no absolute (or even consistent relative) standards for the relationships between facts and values, science and policy, and the technical and the political" (p. 171). Take the example of the case of a seemingly straightforward factual determination such as whether the West Antarctic Ice Sheet is melting, how much, and with what consequences. There were (and still are) numerous value judgements built into the very scientific process of assessment. For example, how "dangerous" would this physical event be? The authors comment: "In any case, what constitutes 'dangerous' goes beyond emissions profiles and the physics of ice sheets. It also involves social, economic and biological facts that bear on not only disruptive effects but also the capacity to adapt. The [related] choice of 2°C as the marker of "dangerous anthropogenic interference" emerged from a complex process in which science and policy mutually informed (some would say deformed) each other" (p. 173). To use a variation on an ancient metaphor, the authors summarize: "values are present all the way down" (p. 194).

At the same time, as the three cases of large scale assessment projects reviewed in this book attest, the value of science for policy

is thought to lie precisely in it remaining isolated from ‘political’ interference, direction or even influence. Terms like ‘pure’ research in our modern lexica refer not only to purely interest-driven or curiosity-driven research. The word ‘pure’ carries with it an unmistakably moral connotation that draws its power partly from its contrary: the assumed impurity of science that is directed by motives other than pure discovery.

The authors argue that the science done within assessments of this type offers a kind of revealing tension in which to explore empirically how in fact science-policy interfaces were constructed, defined, and maintained during this period. This was occurring when the boundaries themselves were not that self-evident and the political contexts were shifting. The tension is between the ideal and the reality. The ideal is that science is science when there are no motives, no interests, and no concerns weighing on deliberations of truth other than truth. The reality for scientific deliberations carried out in assessments is the science cannot be abstracted from policy considerations if they are to remain valuable as scientific assessments.

So how did the scientists address this tension? Based on both direct interviews and archival evidence, the authors posit that international assessment structures such as those studied in this book were themselves the result of an attempt to deal with this tension. The scientists interviewed, for example, “came to believe that international assessments would be viewed as more objective—and would therefore carry more authority—than national assessments, which would be perceived as tethered to the policy aims of the governments of the countries involved” (p. 180). The result provided the scientists involved with a kind of safety in numbers, allowing them to remain on the ‘science’ side of the ‘science-policy border’. It allowed them “to situate their work as deeply as possible in the technical domain, and to become even more scrupulous about avoiding any suggestion of policy recommendation” (p. 183), while maintaining the very efficacy of their scientific determinations for determining policy. They tried to have their cake and eat it too.

Overall, the book’s authors clearly have an agenda in their discussion of the science-policy border as it emerged from these case studies. It is to reinstate for the 21st century what Chapter Five explores as a mid-20th century ideal. Mid-twentieth century science, in the USA at least, enjoyed a kind of policy relevance because of the sense that the

scientist was society's "sentinel and problem solver" (p. 174). In the USA, scientists working within President Eisenhower's President's Science Advisory Committee (PSAC) operated under a clear and presidentially encouraged freedom to regard their science as directly relevant and important for political decision making. That is the ideal of the scientist as "sentinel": actively pursuing scientific knowledge, yet willing to apply that knowledge for policy determinations. "Society needs scientists to be sentinels on issues like ozone or acid rain or climate change... because laypeople are not in a position to appreciate these sorts of threats or in some cases to even know that they exist..." This ideal, somewhat nostalgically entertained, gives the title to the book. In the 1970s, ozone scientists (alone) understood the threat that ozone depletion presented. We needed them to be sentinels. We needed them to be discerning experts" (p. 190).

Ultimately, the authors wish to replace the idealized hard border between science and policy, and instead to recognize not so much a border but rather a continuum between science and policy, between fact and value. Scientists and policy makers need to work out collaboratively, in different contexts, their respective placements on that continuum. Scientists engaged in research on policy relevant questions, such as whether and how much to reduce emissions of ozone-depleting substances to prevent deleterious effects on plant and animal health, cannot be asked to refrain from drawing policy conclusions that are proximate to their scientific knowledge.

In a general sense the lessons learned are not new, although the authors seem somewhat unaware of this. Perhaps these conclusions appear as self-evident to any scientist reading this review who has done work within assessment contexts. The book is nevertheless refreshing in its attempt to address the actual practice of science within assessment contexts, in order to determine how scientists have collectively and individually walked back and forth across the 'border' that our culture seems to maintain between fact and value, between science and policy. As such, the book concludes with recommendations for both scientists and policy makers to eschew simplified pictures of the work that experts at either end of the continuum engage in. They wish us to allow more contingent and less idealized norms of behaviour and discourse to guide the practices of assessment, at whatever level. The authors call this the "process of discernment", to capture the multiple valences of what we mean by 'knowledge' in assessment

contexts along the science-policy continuum. The authors invite, for example, more generous attitudes to what constitutes ‘research’, to allow assessment contexts the possibility of generating new research questions and answers. Such freedom is otherwise precluded if current rigid distinctions are maintained, such as are enforced by IPCC, between “assessment as review of existing knowledge” and “research as new knowledge”. They further point to a more generous attitude to concepts such as uncertainty, ignorance, bias, objectivity and value-neutrality, which can hamper the capacity of scientists to make forays into value-laden, policy relevant domains. Idealizing objectivity, for example, can come with the cost of silencing a scientist from much needed engagement in policy decisions. And finally, there is a call to what science policy experts would identify as adaptive management (though the authors do not use the term), in which the feedback loops and iterative approaches to knowledge questions are embraced. Assessments can be valuable for indicating frankly where ‘progress’ in science has in fact not occurred, through failing to perform adaptive management.

A final comment concerns the most obvious limitation of the book. Rather sweeping generalizations are made about ‘science’ and ‘policy’ when these are rather narrowly handled within the context of three case studies, limited by time, topic and place. But if we take the book’s conclusions in a provisional light, this only underscores the value of the case-study approach to understand the crucial role of “Discerning Experts”.

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