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The Role of Translation in Transnational Governance

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Abstract

One of the greatest challenges facing environmental governance is the interaction between science and governance. Translation is proposed as a means to analyze these interactions. To achieve some consensus on the quality of translations, norms and criteria must be developed in order to guide translation, namely through linkage institutions that promote productive misreadings of scientific information by governance authorities and permit judgments regarding the quality and utility of these misreadings. Given the multiplicity of sites – state and non-state – that have access to scientific and other environmentally relevant information, the structures and processes through which translation of scientific knowledge takes place will be subject to ongoing contestation. Nevertheless, the acknowledgment that scientific knowledge must be interpreted and its meaning reconstituted within governance systems may foster a healthier division of labor between science and governance, one in which political and legal authorities assume their responsibility to make judgments and decisions.

Keywords

autopoietic theory – ecological modernization – social studies of science – translation – transnational ecological governance

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1 Introduction

Contemporary understandings of science as a social practice have placed us in a precarious position, described by William Rehg as Kuhn's gap.[1] By focusing on scientific practices rather than 'abstract rules of method and logical inference',[2] Kuhn clears the ground for an understanding of scientific discovery as 'non-rational and unpredictable'. At the same time, he insists on the reasonable, rational character of science.[3] The processes through which scientists make judgments, and through which communities of scientists come to share those judgments, remain obscure; as Rehg puts it, 'Kuhn seems to leave us (nonscientists) with a deferential trust in the sociology of the science community'.[4] Sociologies of scientific knowledge (SKK) took up Kuhn's invitation to explore scientific practices, but not his invitation to explore the reasonable or rational aspects of science.[5] The presentation of science as human knowledge, whose production is governed by practices and principles developed in utterly human, contingent ways rather than by natural law perceptible by universally valid processes of reasoning or by a unique, 'scientific' method, has immense ramifications in a society that has come to depend heavily on science as the last remaining source of objective knowledge about the world. This happens at a juncture when scientists are being much more open and honest about the uncertainties inherent in their knowledge, especially knowledge of complex ecological and climatological systems.

The difficulties and challenges posed by science-governance interactions are rooted in the very different logics and objectives of these social systems. Increasing the scientific literacy of political and legal authorities, or improving the communicative capacity of scientists, would go a great distance to enhancing interactions between individuals, whose education and training make them capable of operating in a variety of social systems, or at least gaining a passive understanding of those systems. But this does not mean that it will be any easier for governance institutions to absorb scientific information and transform it into policies and laws. The complexity and dynamism of scientific understandings of ecosystems cannot simply be reproduced within politics and law; some process must be undergone through which scientific

1 William Rehg, *Cogent Science in Context: The Science Wars, Argumentation Theory, and Habermas* (MIT Press 2009) Chapter 2.

2 Ibid 43.

3 Ibid 44–5.

4 Ibid 49.

5 Ibid 50–53.

knowledge is recast in political and legal terms. I propose to describe and analyze this process as translation, understood not as the transfer of meaning across boundaries (from one language, jurisdiction, or system to another) but as the parallel constitution of meaning in two locales, in such a way that both meanings are understood, or rather, productively misunderstood, to possess some form of equivalence.

Translation of scientific information is a governance problem in that politics and law depend heavily on science, notably in fields such as environmental protection. It is also a governance problem in the sense that the identification of accurate and reliable scientific information and its transformation into forms that can be used within governance networks must be carefully structured; furthermore, the structures that are developed for this purpose will be continually contested. These structures, I argue, can be understood as linkage institutions, drawing on Gunther Teubner's work on structural coupling between social systems. Teubner argues that linkage institutions foster productive misreadings of communications by more than one social system. For example, the reading of the 1.5° C threshold above pre-industrial levels as an outer limit for the purposes of law and policy has had a modest – no doubt too modest – influence on states' efforts to reduce global warming.[6]

Building on the concept of the linkage institution, I recast productive misreading as translation, understood in the sense outlined above as the reconstitution of meaning across system boundaries. The process of translation does not take place in a normative vacuum: it proceeds according to principles and criteria that allow actors to reach judgments about the quality of the translation. In the context of interactions between science and governance, this will require agreement on a wide range of issues. Attention will here be devoted to criteria that help to determine what counts as a reliable source of scientific knowledge or a rigorous scientific conclusion (identifying texts that ought to be translated into the language and logic of governance systems) and identifying the appropriate approach for (re)constituting the meaning of the selected text for the purposes of governance systems. Bound up in this second step is a wide range of considerations, relating to the interpretation of the scientific text, the identification of the purposes for which governance systems will make use of it, and finally, determining the standards that determine the equivalence of the two texts, that is, the degree to which the meaning of the two texts will be deemed (productively misread) to be the same.

6 There are good reasons to believe that this misreading has not been particularly productive at all; I present this simply as an example of a translation from scientific to political understandings that has the potential to structure and orient political debates.

I begin with a discussion of the increase of flows of environmentally relevant information and the increasing number and variety of sites at which this information is taken up and processed (2). While it is true that the increased volume and accessibility of information has significant implications for the structure of governance institutions and processes, much depends on the capacity of the range of actors that have access to information to develop means to make use of it, as well as the extent to which their efforts are considered credible or useful by other actors implicated in governance. I then go on to consider the special case of scientific knowledge, and the challenges of rendering this knowledge accessible to politics and law (3). I cast the process of transforming scientific knowledge into forms accessible to governance as translation, mapping this concept on to Teubner's discussion of productive misreading at the interface between social systems (4). Because translation is here understood as a key aspect of environmental governance, my focus then turns to the role of linkage institutions – located throughout transnational governance networks –, that support and guide the process of translation (5), before concluding (6).

2 Information for Governance; Governance of Information

Environmental governance depends heavily on information.[7] A wide range of data is in circulation around the world, generated by governments, intergovernmental organizations and regimes, regulatory bodies such as stock exchange commissions, corporations and industry associations, and, increasingly, private governance bodies such as certification organizations. This data is often directly relevant to environmental quality objectives, and includes data on ecosystemic baselines, outputs in the form of emissions or effluents, production and consumption, movement of products and substances across borders, and compliance with norms and standards. While initially the collection and processing of environmentally-relevant information was a task for government[8] and intergovernmental organizations,[9] non-governmental organizations have become increasingly implicated in collecting as well as

7 Arthur P J Mol, 'Environmental Governance in the Information Age: The Emergence of Informational Governance' (2006) 24 Environment and Planning C: Government and Policy 497.

8 Arthur P J Mol, *Environmental Reform in the Information Age: The Contours of Informational Governance* (Cambridge University Press 2008) 6.

9 The relevance of information to governance at the international level is analyzed in Abram Chayes and Antonia Handler Chayes, *The New Sovereignty: Compliance with International Regulatory Agreements* (Harvard University Press 1995).

consulting and analyzing information.[10] However, it is also important to recognize that the mere availability of information means relatively little to governance institutions. The quality and reliability of the information must be assessed in some way, and the information must be transformed in some manner before it can be made useful to governance institutions.[11] Meeting these needs is likely to become more complex. Flows of environmental impacts and environmentally relevant information move across international borders, eluding the control of states and international institutions. Environmental information is available to be accessed, interpreted, and acted upon at a wide range of sites, both within and beyond governments and state-based regimes. Yet such information is unlikely to be simply accepted at face value, given that doubts of various kinds are emerging about the universal validity and reliability of science.[12] The upshot is that the governance of information is likely to take place in multiple sites, based on a variety of potentially conflicting norms, principles, and standards.

Arthur P J Mol notes, 'the enhanced possibilities and capacities of environmental information collection, processing, transmission and use; the increase in the number of people and institutions having access to *and thus being able to make use* of information; and the time-space compression of information flows in a globalizing world order'.[13] It is on this point between access to and making use of information that I wish to dwell. If the history of interactions between science and policy, particularly in the area of environmental governance, have shown us anything, it is that the availability of information regarding environmental performance, risks, etc. does not drive environmental governance in a linear causal manner. Rather, the influence of scientific information over governance decisions and outcomes is indirect, moving through complex pathways. Accessibility of information does not mean transfer of meaning, or even discernible influence. Governance authorities cannot simply act as clearing-houses for information; they must carry out a range of operations on the information in order to be able to make use of it, or put it at the disposal of other actors in governance networks that can. One such operation relates to warranting the quality of the information, including its accuracy and reliability, and the degree of confidence that it inspires. Others involve the

10 Mol (n 8) 7.

11 Ibid 7–9.

12 Ibid 86–90.

13 Ibid 84–5; 89. Emphasis added. Arthur P J Mol, 'Globalization and Environment: Between Apocalypse-Blindness and Ecological Modernization', *Environment and Global Modernity* (Sage Publications 2000) 134 ff.

various moves that must be made between the reception of scientific conclusions and the promulgation of norms and standards that reflect these conclusions in some form or another. A key role fulfilled by both state and non-state agencies that straddle science and governance is thus to act as linkage institutions among the social systems implicated at these intersections.

Consider potential responses to a report that a Mauritian-flagged vessel was observed fishing in the Southern Ocean. The vessel's target catch is likely to be the mind-bogglingly valuable and extremely vulnerable Patagonian toothfish; the vessel may not be respecting the web of conservation measures that various states have adopted to protect that species – indeed, its owner may have chosen the state of registration based on its low level of cooperation in international fisheries conservation and management regimes. While rules governing the exercise of jurisdiction on the high seas make it virtually impossible for states other than the state of registry to take action against the vessel on the high seas, there are other ways in which concerned governments could make use of information regarding the vessel's fishing activities, notably denial of access to ports and thus to markets. Other actors, such as wholesalers and retailers, might also act on available information regarding the manner in which the fish were caught, particularly if they have an eye on markets for sustainable products and have good reason to believe that information about the unsustainable nature of the catch and resulting products will be accessible to consumers.[14]

A good deal of work must be done to prepare the ground at each step of the way from ocean to market, and to structure decisions that are made along the way. For example, scientific knowledge contributes to an understanding of the toothfish as vulnerable, and can also have an influence on perceptions of its value, both positive (it is rare) and negative (conscientious consumers will avoid it). The fact of Mauritian registry becomes relevant to a wide range of actors only if it can be placed in context in an authoritative manner, for example by reference to a validated[15] list of states that have lax conservation standards and enforcement and that avoid international fisheries conservation regimes. The reliability of data on the fishing activities of the vessel will also need to

14 These mechanisms can transform common pool resources, such as fishery resources on the high seas, into 'club goods,' accessible only to members of a club (e.g. a network of regimes on fisheries conservation and management) and/or actors that agree to abide by the club's rules: Elizabeth R DeSombre, *Flagging Standards: Globalization and Environmental, Safety, and Labor Regulations at Sea* (MIT Press 2006).

15 Criteria for inclusion on the list would need to be agreed upon, and authority would need to be delegated to a particular body to constitute and update the list.

be assured. As to the range of actors capable of acting on these various pieces of information, states are the most obvious; they could, either individually or in a coordinated fashion, subject the vessel to further inspection when it puts into port, or refuse to offload the fish and facilitate its entry into the market – they could, in fact, deny access to their ports. Alternately, port states could find means to have information on the fish's provenance follow it through various market transactions until it reaches the final consumer; at each step along the way, the various actors involved in these transactions could choose not to purchase the fish, or insist on a discounted price. One way to ensure the transmission of such information would be through the labelling or certification of the fish as having been harvested in conformity with existing norms and standards. However, it should be noted that eco-labelling is a complex process, involving the translation of a mass of data points into a fairly simple, accessible signal to wholesalers, retailers, consumers, and observers of the fishery industry.

Thus far, we have assumed that the norms and standards governing the fishery are generally accepted as being robust – that respect for such standards is a reliable proxy for sustainable harvesting. This is by no means self-evident. Perceptions of the robustness of such standards will depend heavily on, among other things, perceptions of the validity of scientific conclusions that are relied on by policy makers, and perceptions of the extent to which regulatory standards incorporate those scientific conclusions in a meaningful way. There may be a high degree of consensus regarding the manner in which the interface between science and policy is to be managed, and this consensus may be reflected in the standards adopted by governments and intergovernmental regimes. If this is the case, fisheries that respect those standards will be understood to be sustainable. However, the existence of such a consensus cannot be taken for granted. States may approach the interface between science and policy in a variety of ways; different decision-making contexts may call for different approaches. When one adds to this already complex situation the existence of multiple, including non-state, sites of decision-making, it becomes even more apparent that questions regarding the structure of interactions between science and governance will receive a wide variety of different answers. Whether this fragmentation is tolerable remains to be explored.

The translation of scientific and governance information is of fundamental importance to the flows of information through governance networks: such flows either do not happen or have little impact unless there are processes for rendering information relevant and deployable at various points in the network. Too often, the relevance, and the difficulty, of this task of translation is underestimated, or ignored altogether, particularly if governance systems are processing scientific communications on the basis of an overly simplified

model of the nature of scientific knowledge. This model has its roots in the early modern era, at a time when the means of acquiring scientific knowledge were changing as a result of increasingly sophisticated instruments, which in turn led to new understandings about the role of observation in the development of understanding of the natural world.

3 Governance and Scientific Knowledge

The early modern period in European history is of great importance to reflections on the relationship between science and governance, as it is the time at which the distinction between the two emerged. Previously unquestioned or inadequately examined assumptions underlying contemporary understandings of the respective roles and natures of science and governance are subject to growing scrutiny and critique; it is these very assumptions that came to be crystallized in the early modern period. As a result of decades of social sciences and humanities work on science, the understandings held by Galileo about the unmediated nature of their insights into the natural world are rapidly losing currency, but there is great uncertainty regarding the premises upon which new or altered understandings are to be built. Important and highly influential organizations such as the Intergovernmental Panel on Climate Change (IPCC), which were designed to facilitate interactions between science and governance, remain dependent on a division of labor between the two that is increasingly being called into question.[16]

The emphasis in the discussion that follows is on mediation rather than translation. The concept of mediation nevertheless lays the groundwork for a discussion of the translation of scientific knowledge into law or policy. If Galileo was right to contend that his knowledge was unmediated, then no translation between law and governance need occur: facts are and remain foreign bodies within the political system, and the point is not to penetrate science's meaning but to act on the factual basis that science has provided. If, on the other hand, scientific knowledge is mediated, and scientists, like political authorities, legal scholars, moral philosophers, and others engage in processes of

16 Silke Beck, 'Moving Beyond the Linear Model of Expertise? IPCC and the Test of Adaptation' (2011) 11 Regional Environmental Change 297; Sheila Jasanoff and Brian Wynne, 'Science and Decision Making' in Steve Rayner and Elizabeth L Malone (eds), *Human Choice and Climate Change: The Societal Framework* (Battelle Press 1998) 1; Clark A Miller, 'Climate Science and the Making of a Global Political Order' in Sheila Jasanoff (ed), *States of Knowledge: The Co-production of Science and Social Order* (Routledge 2004) 46.

interpreting, judging, and persuading, then we can indeed think in terms of processes of meaning- and sense-making, and translation is relevant.

When children look through telescopes for the first time, they are already well prepared to understand that they are looking at a magnified image of something that is actually there, and which they can discern barely or not at all with their unaided vision. As Steven Shapin notes,

> When you and I learned these skills as students, we had enormous advantages over Galileo's contemporaries. We belonged to a culture that had already granted the reliability of these instruments (properly used), that had already decided for us what sorts of things authentically existed in the domains of the very distant and very small, and that had provided structures of authority within which we could learn what to see (and what to disregard). None of these resources was unproblematically available to Galileo; *they had to be laboriously created and disseminated*.[17]

Galileo was aided in this endeavor by work carried out by his predecessors and contemporaries on optics, in which, as Ofer Gal and Raz Chen-Morris note, the telescope was not understood to be an extension of human vision but a replacement for it, a position they style 'radical instrumentalism.'[18] Drawing on such understandings, Galileo presented a mathematical understanding of the telescope's functioning: '[b]eing thoroughly mathematical, the telescope was not an extension of the eye but of reason.'[19]

Galileo's labors were not all observation and mathematics, of course. As much as he sought to report his findings as a simple matter of looking and seeing, Galileo was often compelled to reason by analogy, undermine alternative explanations for the phenomena he observed, and, very often, speculate as to the reasons why his conclusions about what he was observing were correct. Galileo covered many pages explaining what he sought to render obvious: the moon's surface was covered with peaks and valleys.[20] That it was *not* obvious is suggested by the fact that Galileo was not the first person to record

17 Steven Shapin, *The Scientific Revolution* (University of Chicago Press) 73–4. Emphasis added.

18 Ofer Gal and Raz Chen-Morris, *Baroque Science* (University of Chicago Press 2013) 44. This was a risky move, as it undermines belief in the capacity of human vision to perceive the world in an unmediated manner: ibid.

19 Ibid 95.

20 Galilei Galileo, *Siderius Nuncius, Or, The Sidereal Messenger* (University of Chicago Press 1989) 48 ff.

observations of the moon as viewed through a telescope: he was preceded by some months by an Englishman, Thomas Harriot, who saw not peaks and valleys but spots. Harriot, unlike Galileo, had not been exposed to the art and science of perspective drawing; Galileo's extensive training in perspective may well have prepared his mind to see the play of light and shadow where Harriot merely saw uneven coloration.[21] However, this interpretive work was presented not as such, but as mere observation – which was painted as a superior means of gaining insights into the natural world. Shapin argues that 'the root idea of modern *empiricism*, the view that proper knowledge is and ought to be derived from direct sense experience' lies in the early modern era.[22] 'Thus,' argues Shapin, 'emerged a cleavage between those branches of human knowledge which were capable of producing certainty and those that were not, and with an inversion of the order of importance of the two'.[23]

The IPCC bears important hallmarks of 17th century understandings of scientific knowledge: certainty in knowledge is identified with the disinterestedness and objectivity of those who produced it and the extent to which properly trained people with adequate knowledge are in agreement regarding its content.[24] Politicians are a disputatious lot; they are liable to be excessively concerned with their own short-term self-interest and that of their constituencies and unable to agree on a course of action. If they are provided with scientific certainty, for example about the causes of climate change and the consequences of failing to take action to regulate them, then the path to action ought to become clear, or so it seems to many observers. As in the early modern era, the work of interpreting, assessing, reaching judgments, and persuading in which climate scientists engage receive little attention in IPCC reports; emphasis is instead placed on the work of instruments, laboratories, and methods. When climate modelers, as opposed to their models, are foregrounded, as happened during the so-called 'Climategate' incident, confidence in the knowledge

21 Samuel Y Edgerton Jr, 'Galileo, Florentine "Disegno," and the "Strange Spottednesse" of the Moon' (1984) 44 Art Journal 225, 226–7.

22 Shapin (n 17) 69–71.

23 Ibid 101–6.

24 The IPCC does not conduct research; rather, it assesses the body of existing research 'relevant to understanding the scientific basis of risk of human-induced climate change, its potential impacts and options for adaptation and mitigation:' *Principles governing IPCC Work*, approved October 1998, as amended October 2013, https://www.ipcc.ch/pdf/ipcc-principles/ipcc-principles.pdf. The Principles further state that 'IPCC reports should be neutral with respect to policy, although they may need to deal objectively with scientific, technical and socio-economic factors relevant to the application of particular policies.' Decision is, in principle, by consensus: para. 10.

producers and their knowledge can suffer a tremendous blow. The loss of confidence in scientists, and in science itself, is catastrophic in a complex, pluralist, heterogeneous world: if scientists cannot provide objective, universally valid knowledge of the natural world, no one can.

Many observers, and indeed many participants in the IPCC, have long reached the conclusion that the premises governing the IPCC's work must be re-examined. For example, they argue that the emphasis on consensus, particularly in a field as fraught with complexity and uncertainty as climate science, pushes many important scientific insights off the table; and that the requirement that IPCC reports not comment on the political implications of their findings is based on flawed understandings of the conditions under which rigorous scientific knowledge is produced.[25] Others argue that, far from protecting science and politics from one another, the structure and enforcement of the division of labor between the two spheres politicizes scientific debate and even scientific research in largely unacknowledged and undesirable ways.[26] Extensive attention has been devoted, both by scholars and by the IPCC itself, to the manner in which the IPCC ought to communicate uncertainty.[27] The challenges are enormous: it is no longer open to the IPCC, nor to climate scientists generally, to simply exert the authority of science, gesturing away from themselves and towards models, instruments, and methodology, as Galileo sought to do. But we have not yet come up with a generally accepted approach for the reaching of agreement on the cogency of scientific conclusions and judgments.[28] Nor, under conditions of modernity, is there a readily available way to reconstruct the authority of science, because there is no longer a centralized means of controlling or directing conceptions of scientific authority. Amore robust understanding of the processes and mechanisms

25 Mike Hulme, 'Lessons from the IPCC: Do Scientific Assessments Need to Be Consensual to Be Authoritative?', *Future Directions for Scientific Advice in Whitehall* (Centre for Science and Policy 2013); Beck (n 16) at 304; Jasanoff and Wynne (n 16) at 12.

26 Beck (n 16). I do not read Beck as arguing that politicization of the process of scientific knowledge production is in and of itself a bad thing, but rather that the nature of the political pressures that scientists are operating under lead to distortions in their research and in the manner in which they communicate about that research that are unfortunate and inappropriate.

27 Roger N Jones, 'The Latest Iteration of IPCC Uncertainty Guidance: An Author Perspective' (2011) 108 Climatic Change 733; Michael D Mastrandrea and Katharine J Mach, 'Treatment of Uncertainties in IPCC Assessment Reports: Past Approaches and Considerations for the Fifth Assessment Report' (2011) 108 Climatic Change 659.

28 Rehg (n 1).

through which scientific knowledge comes to be translated into the language of governance could contribute significantly to addressing this impasse.

4 Science and Governance: Translation as Productive Misreading

Controversy regarding the IPCC is not an isolated phenomenon. The possibility of deriving certain, unambiguous knowledge of the natural world through a combination of method, technique, instruments, and apparatuses has been subject to sustained criticism from many quarters, notably from scholars associated with Science and Technology Studies who reveal scientific knowledge to be a product of complex formal-logical and pragmatic, social practices.[29] In short, judgment in the face of uncertainty is as necessary to the drawing of scientific conclusions as it is to political, legal, or ethical conclusions. While this could lead to a crisis of confidence in science, it also points to potential opportunities for enhanced interactions between science and other forms of knowledge, for example, following William Rehg, by treating the judgments of science as loci for the development of linkage institutions between science and governance.[30]

Rehg acknowledges that the content of scientific arguments does not travel very far; indeed, given the high degree of specialization in science, it may not travel far even within the scientific community. As scientific arguments are taken up farther afield, different means for judging their rigor must be identified. Rehg describes the cogency of argumentation as a boundary concept, providing a basis on which scientific arguments can be judged in a range of contexts, extending to fora for political and legal decision-making. But the scientific judgment does not pass unaltered into political and legal systems; it must be transformed in such a way that it can be read and responded to in those systems.[31] This transformation is understood in autopoietic theory

29 Ibid.

30 Ibid 248 ff. 'Linkage institution' is not Rehg's term, though he does speak of the need for the development of institutions to support interactions between scientists on the one hand and political authorities and citizens on the other.

31 Scientific, political, and legal systems, understood as autopoietic systems, cannot communicate with one another directly: these systems interact with their environment in selective ways, for example by transforming scientific information into evidence for or against a given legal conclusion, such as the existence of a causal link between negligent act and harm. On operative closure generally see Niklas Luhmann, *Law as a Social System* (Oxford University Press 2004) 79 ff.

to occur when a communication, such as a judgment regarding the cogency of an argument, is analyzed by two or more systems simultaneously.[32] The judgment itself does not pass across the boundaries of scientific, political, and legal systems; rather, a scientific judgment serves as the basis for the formulation of an independent judgment within political and legal systems. We observe or impute continuity between the scientific and the political and legal judgments on the basis of the simultaneous evaluation of the judgment by more than one system. This means, of course, that when we assert that a political or legal judgment is 'based on' a scientific report or study, we are in fact referring to separate and distinct judgments that are prompted by reference to one and the same communication.[33] If meaning does not pass across boundaries, on what is interaction between social systems based? Furthermore, how can translation, whose *raison d'être* is (apparently) to transfer meaning from one language to another, be relevant here?

An important source of influence by one social system on another is what Gunther Teubner describes as 'productive misreading' of communications.[34] This process of translation 'geht [...] nicht als bloße Übertragung identischen Sinnes in einer anderen Sprache vor sich, sondern so, dass sich rechtseigene Begrifflichkeiten nach den Bedingungen ihrer inneren Entwicklungslogik [...] irritieren und daraufhin zu ganz andersartig strukturierten Neubildungen inspirieren lassen.[35] When governance systems analyze scientific communications, such as IPCC reports, the meaning to be attributed to those reports is created within those governance systems, but the interpretation given to the same communication among scientists is inevitably distinct. In this manner, thresholds for ozone layer depletion, global warming, or loss of biological diversity that serve as heuristics for scientists to organize their observations and

32 Ibid 82; Gunther Teubner, 'The Two Faces of Janus: Rethinking Legal Pluralism' (1991) 13 Cardozo Law Review 1443, 1446.

33 Luhmann (n 31) 82.

34 Teubner, 'The Two Faces of Janus' (n 32); Gunther Teubner, 'Breaking Frames: Economic Globalization and the Emergence of Lex Mercatoria' (2002) 5 European Journal of Social Theory 199, 161; Gunther Teubner, 'Rechtswissenschaft Und -Praxis Im Kontext Der Sozialtheorie' in Stefan Grundmann and Jan Thiessen (eds), *Interdisciplinäres Denken in Rechtswissenschaft und -praxis* (Mohr Siebeck 2015) 156.

35 Teubner (n 34) 157. Below, I take issue with the notion that translation from one language to another is a simple matter of moving meaning between languages, which is precisely why I see translation as an apt concept to capture the process of sense-making on different sides of system boundaries.

communications may be productively misread as planetary boundaries that inform environmental governance.[36]

This approach to the notion of equivalence between scientific, legal, and political judgments is echoed in various strands of scholarship on translation, in which the equivalence of original and translated text is understood, explicitly or implicitly, to be based on a convention or understanding of the two texts as equivalent.[37] Of particular relevance are discussions of the purposes for which the translation is undertaken, recognizing that the process of translation involves reading the original text in light of that purpose rather than seeking to seize the essence of the original in order to reproduce it in the target language.[38] One way to explore the purpose of a translation, which is highly relevant to the translation of legal provisions from one language to another, is to consider the effect the text is intended to produce in the source language. This is more honest, as Roderick Macdonald pointed out, than claiming that the whole of the norm as articulated in the source language can be captured, either in the process of interpretation or in that of translation (which depends, naturally, on a prior interpretation).[39]

A further context in which the translation of a legal norm must be carried out within the legal system is the case of legal 'transplants,' that is, the 'borrowing' or taking up of a legal rule or principle from one legal tradition by another. Legal transplants may be carried out in contexts in which attempts to capture the essence of the norm in the source tradition are clearly irrelevant, for example when the norm is transplanted for pragmatic reasons, based on

36 Johan Rockström and others, 'Planetary Boundaries: Exploring the Safe Operating Space for Humanity' (2009) 14 Ecology and Society 32; Will Steffen and others, 'Planetary Boundaries: Guiding Human Development on a Changing Planet' (2015) 347 Science 736.

37 Eugene A Nida, *Toward a Science of Translating: With Special Reference to Principles and Procedures Involved in Bible Translating* (1964) and Werner Koller, *Einführung in die Übersetzungswissenschaft* (Quelle und Meyer 1992) contrast formal and dynamic equivalence; John Cunnison Catford, *A Linguistic Theory of Translation*, vol 31 (Oxford University Press London 1965) speaks of textual equivalence and formal correspondence; Peter Newmark, 'An Approach to Translation.' [1973] Babel: International Journal of Translation refers to semantic and communicative translation. See generally Otto Kade, *Zufall Und Gesetzmäßigkeit in Der Übersetzung* (VEB Verlag Enzyklopädie 1968); Alice Leal, 'Equivalence', *Handbook of Translation Studies Online*, vol 3 (John Benjamins 2012).

38 Lawrence Venuti, *The Translation Studies Reader* (Routledge 2000); Mary Snell-Hornby, 'The Turns of Translation Studies', *Handbook of Translation Studies Online*, vol 1 (John Benjamins 2010); Mary Snell-Hornby, 'What's in a Turn? On Fits, Starts and Writhings in Recent Translation Studies' (2009) 2 Translation Studies 41; Hans J Vermeer, 'Skopos and Commission in Translational Action', *The Translation Studies Reader* (Routledge 2000).

39 Roderick A Macdonald, 'Legal Bilingualism' 42 McGill Law Journal 119.

perceptions that the transplant may serve to solve problems that have arisen within the source tradition. In such cases, the fact that the transplant results in the transformation of the norm may be regarded as unproblematic: equivalence between source and target may be much less important than the identification of potential solutions to impasses or perceived gaps in the target tradition. On other occasions, however, the pedigree of the rule will be of considerable importance, for instance when courts look to international treaties to interpret domestic implementing legislation, or in the identification of general principles of international law within the meaning of Article 38(1) of the Statute of the International Court of Justice. In such cases, claims that the norm as transplanted into the target tradition is equivalent to that of the source tradition could be seen as integral to the further claim that the transplant itself is valid; otherwise, it could be argued, the transplanted norm cannot be understood as validly constituted within the target tradition.[40]

In the context of translation from one social system to another, the purposes for which the translation is taking place vary immensely. Where governance systems are translating scientific knowledge, the purpose could be understood to be the identification of the 'right' meaning of the scientific communication in order to generate the 'right' response to a problem. If climate change is anthropogenic, then its causes must be regulated; if it is not, there is no point in concerning oneself with causes and the focus should instead be on adaptation. Understood in this manner, translations into the language of governance would need to be equivalent to the scientific communication because the authority and validity of law and policy is seen to rest on the authority and validity of science. As to the proper interpretation to give to scientific communications, similar difficulties arise: scientific, political, and legal systems have very different purposes and objectives. We could conclude that the effect which scientific knowledge is meant to produce, and which political and legal systems seek to replicate, is certainty: this would help to explain why consensus is considered to be so important within boundary organizations such as the IPCC. However, this assumes that scientific insights are relevant to political

40 On some readings of the method for identifying general principles of international law, since the basis of the validity of such an operation is the existence of a given norm in a wide and representative array of legal traditions around the world, the 'essence' of the municipal norm must indeed be drawn into international law: Jean Combacau and Serge Sur, *Droit International Public* (8e edn, Montchrestien 2008) 109–10. Lord McNair in *South-west Africa* took a different, largely functional approach to 'indicat[e] … the policy and principles' to be articulated at the international level: *International Status of South-West Africa*, Advisory Opinion, ICJ, 11 July 1950: Separate opinion of Lord McNair 148.

and legal decision-making only when they reach the level of uncontroversial fact. The wisdom of waiting for such a degree of certainty regarding complex systems such as climate is highly dubious, however.[41] We now know too much about science as a social practice to continue to rely on a 17th century conception of science as unmediated knowledge, even if we wanted to. The continued relevance of equivalence, and more in general the relevance of the concept of translation to interactions between science and governance, can usefully be reconceptualized as establishing a relationship between a scientific communication (wetlands in coastal areas reduce vulnerability to flooding events) and a political (protection of wetlands is vital to climate change adaptation) or legal one (destruction of wetlands can result in liability for loss of ecosystem services) that is adequate to render the political and legal decisions non-arbitrary and justifiable, even if it cannot serve to place them beyond question.

5 From Boundary Organizations to Linkage Institutions

Boundary organizations such as the IPCC are charged with facilitating the translation of scientific knowledge into law and policy. Among the concerns of architects of boundary organizations are the rigor and accessibility of scientific communications. Such communications must be *both* highly reliable *and* shaped and streamlined for ready consumption by policy and legislative processes. The processes through which IPCC reports are generated are designed to minimize the need for governance authorities to exercise discretion or judgment by establishing a factual basis for action. What we see in the constitutive and procedural rules within boundary organizations is the construction of the institutional structures and processes through which translation from science to governance is to be carried out, as well as the means through which the presence or absence of equivalence is to be established. But such organizations are based on the assumption that scientific meaning can be transmitted to governance systems, and need not be built anew within those systems.

The concept of a linkage institution departs from the understanding, articulated above, that communication between systems is impossible; what is instead required are means by which systems can be brought into regular, and increasingly stable, interaction. The creation of boundary organizations like the IPCC contributes to this end: the authors of IPCC reports need no longer struggle to win the attention of governance authorities, since the publication of such reports is now clearly established as an event of great political and legal

41 Mol (n 7) at 498.

significance. Furthermore, an immense amount of effort has been expended on rendering such reports relevant to governance institutions. While many features of this institutional design are flawed, it is at least well understood that the generation of communications that will hold the attention of governance structures and potentially influence policy and legal decisions is not a matter of happenstance – it requires careful calibration.

Once the mediated nature of scientific knowledge is recognized, along with the implication that governance structures must interpret scientific knowledge and make judgments about its rigor, as well as its implications for law and policy, certain key features of the design of linkage institutions can be discerned. Central to this process is the acknowledgment of the role of translation, in the sense indicated above. This may go some distance to making it easier for scientists to speak in their own voices when producing scientific communications that are intended to possess some degree of policy relevance, rather than being constrained to produce artefacts that are misunderstood as facts. In particular, the status of scientific insights that cannot readily be packaged as uncontroversial facts could be enhanced. By taking greater responsibility for the constitution of meaning within governance institutions, political and legal authorities could find it easier to take responsibility for making judgments. At present, scientific uncertainty tends to be reconstituted within governance institutions as ignorance, or at the very least as an inadequate evidentiary base for justifying policy and legal conclusions. Linkage institutions could increase the responsiveness of governance institutions to scientific communications:[42] if scientific uncertainty is interpreted as an inevitable result of the complexity of socio-ecological systems, then governance systems could be made more responsive to scientific communications that cannot be construed as conclusions that have gained the status of incontrovertible facts.

This approach presents several advantages. It may alter thinking about the division of labor between governance systems and science, as it is acknowledged that the meaning of a scientific communication must be constituted anew within governance systems: meaning-making cannot be outsourced to science. Rehg's discussion of the cogency of scientific arguments as a boundary object that can promote interactions among scientists working in the same, or different, subfields, as well as interactions with political authorities and members of the public, is illuminating: he notes that cogency 'link[s] a normative idea, the strength or logical character of good reasons, with a psychological effect on audiences, namely, the perception of a persuasive force that is not

42 Teubner (n 32) 1448.

easily resisted. Thus the idea of cogency sits at the boundary between psychological effect and rational content'.[43] He goes on:

> We thus have three reasons for regarding the idea of cogency as a promising boundary concept for an interdisciplinary argumentation theory in the service of a critical science studies. First, as the standard definition and common use imply, 'cogency' is more or less synonymous with a range of expressions that refer to the strength or convincing quality of arguments; it thus has the breadth and flexibility to cover a large territory of approaches to argument evaluation. Second, the term sits precisely at the key point of contention in the science wars, namely at the point where normative and empirical categories come together – where reasons display their psychological and sociological effects. Third, in contrast to terms such as 'valid', the work itself is not overburdened with technical expectations connected with specific modes of argument analysis (e.g., formal logic). Thus, the term is relatively open to theoretical articulation at the sites of interdisciplinary exchange.[44]

Rehg's deliberative democratic approach treats the boundaries around science and other social systems in a very different way than I have done here, but his context-sensitive critical science studies is nevertheless highly relevant to this analysis, particularly because he attends to the obstacles to travel by scientific argumentation and assessments of cogency across contexts.[45] We are likely to detect processes of translation at each of these junctures, because, as Rehg notes, there are no *a priori* norms or standards available to judge the cogency of scientific arguments; these standards are 'generated *within* contexts'.[46] Through this process of generating standards, we see actors actively engaged, rather than passively receiving wisdom about the rigor of scientific argumentation.[47]

I have already outlined the work that is required to create and maintain linkage institutions capable of translating between scientific and governance idioms: identification and vetting of potentially relevant sources of information; assessment of the validity of information; interpretation; translation. I have also noted that, at each of these steps, various sets of standards and criteria

43 Rehg (n 1) 6–7.
44 Ibid 7.
45 Ibid 248 ff.
46 Ibid 277.
47 Ibid 276.

will be implicated in judgments based on information. The IPCC and other boundary organizations serve an immensely significant role besides translation: they are also sites of aggregation of officially sanctioned information, and interpretations of that information. A huge portion of the work carried out by such boundary organizations involves determining who counts as an expert, what counts as expertise, and how relevant information is to be distinguished from irrelevant. Yet, as Mol accurately notes, the capacity of states to control these processes is rapidly diminishing. Data sources, points of access for data and other information, and – importantly – sites that can function as linkage institutions are not only multiplying, but are also emerging in transnational space at some distance from governmental control and influence. This is likely to mean that the structures and processes through which translation occurs, along with the standards and criteria that guide the design and operation of such structures and processes, will be multiple, and heterodox. At the same time, these multiple sites will need to interact with one another in intricate ways, following a network logic, since most of them will not have the capacity to act on the information they hold on their own, as a state could potentially do by adopting a policy or enacting legislation.

This network logic can be illustrated by the deceptively simple example of naming and shaming. A civil society organization such as Global Forest Watch (GFW) that is able to generate or acquire information that supports a conclusion, say, that a forestry company is not implementing its sustainability plan as promised, must issue its communication in such a way that it resonates with other actors capable of acting on this information. Markers will be required that allow states and civil society organizations to deploy the categories legal/illegal (a commitment to implement a sustainability plan was violated) as well as false/not false (respecting the sustainability plan is causally connected to the maintenance of ecosystem function) and legitimate/not legitimate (the sustainability plan was designed in compliance with criteria that are consonant with democratic principles such as appropriate stakeholder input). In addition, conduits are required to channel judgments about the appropriateness of a company's action into perceived or actual impacts such as loss of influence, loss of market share, or declining profits. In our example, consumers of forestry products will need to have access to the communication by GFW, along with access to further information that encourages them to regard this communication as credible and worth being acted upon. Further conduits are also required to permit the forestry company to gain awareness of GFW's communication and of the potential threat to its bottom line. Each of these steps depends on the capacity of a wide range of actors to tune into and interpret signals transmitted through large and complex networks. One crucial element

in the functioning of these networks is the presence of measures, enjoying a reasonably high degree of consensus, by which the cogency of arguments – scientific, political, and legal – can be judged.

As indicated above, these measures will be heterodox. Any hope of central control is futile; indeed, it is far from clear that central control is to be hoped for at all. It will therefore be important for linkage institutions to be transparent about the means used to constitute meaning and draw conclusions about its implications. This, in turn, will depend on widespread recognition that linkage institutions are, in fact, implicated in the constitution of meaning – an abandonment of the assumption, for example, that states are passive recipients of facts generated by scientists.

6 Concluding Remarks

I have registered a certain degree of optimism regarding the capacity of translation processes, understood as the parallel constitution of meaning in two or more systems, to increase the resonance of scientific and governance systems. The misreadings, productive as they may be understood to be, are misreadings nonetheless. Teubner's concept of linkage institutions indicates that translations from one system to another are possible, but he does not conclude, any more than Luhmann, that these translations will inevitably lead to more fruitful system interactions. Fears voiced from many quarters that linkage institutions such as ecosystem services, which permit the translation of a much greater portion of environmental degradation into political, legal, and economic terms, will nevertheless fail to capture the most important dimensions of the nonhuman world, thus either merely delaying or even accelerating environmental catastrophe, are very real and must be given credence. The power and influence that more sophisticated linkage institutions and translation mechanisms will provide will be unevenly distributed, and will in many cases only serve to reinforce pernicious inequality and inequity. No social system, not even one as eloquent as science, will ever do justice to the complexity and majesty of the nonhuman world that we are transforming into a tangle of hybrids. Nor is there any way back, at least for many of us, to a capacity to see the Earth's revolution around the Sun as the manifestation of a perfection that we can glimpse but not comprehend. Governance institutions and processes must assume greater responsibility for judging and deciding, viewing science as partner rather than master discourse.