# An Actor-Network Perspective on Polycentric Governing.
## The Politics of Socio-Material Knowledge Construction

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## Abstract

This chapter addresses polycentric governing with concepts from actor-network theory (ANT). ANT explains how and with what effects contemporary governing is increasingly performed through seemingly neutral socio-material practices of expertise, such as indicators, standards, or assessments. ANT originated in the 1980s, when sociologists started ethnographic examinations of the mundane laboratory practices of natural scientists. Already this early work proposed certain radical claims: for example, that objects have agency, that science is politics by other means, and that micro-practices have macro effects. These propositions have subsequently inspired scholars across the social sciences and humanities. Reflecting ANT's focus on case studies, this chapter provides three inroads into polycentric governing. First, it elaborates on the novel techniques of governing-by-expertise, such as certification schemes or experiments in polycentric governing which draw heavily on black-boxed expert knowledge. Second, inquiring into forms of power, the chapter examines how science-policy networks generate and fix knowledge about global environmental problems. In so doing, they engage in "ontological politics" that describe the power to normalize specific constructions of reality and inevitably exclude other actors and other governing logics. Third, a vignette regarding the United Nations Security Council elucidates the politics of legitimation when Colin Powell tried to convince the world of the existence of weapons of mass destruction in Iraq. This case exemplifies how legitimation is closely coupled with practices of evidence making.

**Introduction**

Think of a stock exchange. What do you picture? Perhaps you recall one of these Wall Street movies: men and women shouting to signal information about buy and sell orders; nervous phone calls; and a closing bell that rings to signify the end of a trading session. Well, times have changed. The floors of stock exchanges have turned into almost quiet places. Human traders, often physicists, oversee the work of digital traders, in the form of algorithms. The work becomes observable on screens, forming a "synthetic, ring-like medium through which tasks flow horizontally – from time zone to time zone – and vertically as things scroll down the screen" (Knorr Cetina, 2015: 112). Who acts here, why, and how? How is it possible to govern these micro interactions of technologies and the global (sometimes devastating) effects that they produce?

The example of algorithms on stock exchanges is indicative of a larger trend of the rapid transformation of societies through science and technology. Critical governing issues as diverse as climate change and drone strikes involve science and technology. In the case of climate change, science takes varying roles: as a cause of environmental problems (e.g. the invention of aircraft); as an admonisher of rational action (e.g. the assessments of the Intergovernmental Panel on Climate Change); and as purported cure (e.g. speculative technologies for reducing CO2 emissions). In all of these cases, science and technology are closely connected to the ways that governing unfolds. For this reason, scholars of Science and Technology Studies (STS) look into the construction of expert knowledge and technology, examining how science and society are co-produced (Jasanoff, 2004).

This chapter introduces an influential line of thought within STS, namely Actor-Network Theory (ANT). ANT emerged in the 1980s, although in the early days it studied not practices of governing, but the construction of scientific facts (Latour and Woolgar, 1979). In entering the laboratories of natural scientists, sociologists paved the way for an ethnographic approach to the study of science and discovered that laboratory practices look much like mundane ordinary activities, including improvisational play with equipment and ad hoc explanations of phenomena (Knorr-Cetina, 1981; Lynch, 1985).

Already this early work proposed a handful of provocative claims: for example, that objects have agency, that science is politics by other means, and that micro practices have macro effects. These propositions have subsequently inspired scholars across the social sciences and humanities. They found resonance in the world of art as well as in museums and public discourses that deal, for instance, with the Anthropocene, the new geological epoch in which human disturbance outranks other geological forces (Haraway, 2016).

However, ANT cannot easily be packaged: it is not a theory in the conventional sense, but rather, as Annemarie Mol argues, "a repository of terms and modes of engaging with the world, a set of contrary methodological reflexes" (2010: 262). Scholars have developed ANT's sensitivities and commitments through empirical research, especially case studies. These investigations show how ANT matters and what happens to ANT when it travels to the realm of politics (Best and Walters, 2013).

In this contribution, I engage in what Endre Danyi (2018) has so aptly called "good treason". That is, instead of applying ready-made theoretical tools, I will explore what it could mean to make a case for ANT's usefulness for understanding politics. (For other scholars of politics who have approached their topics with ANT sensibilities, see Berger and Esguerra, 2018; Best and Walters, 2013; Bueger, 2015.) In introducing some of the sensitivities and commitments of ANT, I link this perspective to polycentric governing, the theme of this volume.

A key argument for the productivity of ANT is that it takes very little for granted. ANT is radically empirical: it seldom defines theoretically the object of investigation such as "the state", but instead examines how the state appears in the case study. Thus, while ANT belongs to the camp of relational approaches (see Gadinger, Bueger and Liebetrau, this volume), it is interested in how these relations come into being in the first place, as well as how they are maintained and fall apart.

For ANT, relations are formed between various actors, possibly including non-humans such as algorithms or animals (Haraway, 2016; Knorr Cetina, 2015). Indeed, we live in a material world and treasure well-designed items. As scientists, we cannot let go of the book we write, the graphs we draw, the choreography we perform, or the chromosomes we decode (Knorr Cetina, 1997). For ANT, relations or associations connect humans, animals, and objects into networks: so-called actor-networks. ANT studies the emergence of these actor-networks, and how they are (or are not) rendered durable.

ANT resonates with polycentric governing, because a main aspect of polycentric governing is its network character: webs crafted between unlikely allies perform governing. Power in these networks does not radiate out from a fixed center, but resides in "heterogeneous assemblages, distributed networks and circuits" that span the globe (Best and Walters, 2013: 333). Michel Foucault has likewise developed a conception that locates power in the relations of institutions, actors, and discourses (see Beckmann, this volume). ANT continues Foucault's journey by paying close attention to the ways that people construct expert knowledge and turn it into mechanisms of governing (Callon, 1986).

The theme of this chapter – the politics of socio-material knowledge production – describes how polycentric governing closely links with expert knowledge. For example, expertise lies at the heart of private certification instruments for coffee and forest products, internet regulations, climate change policies, or even international security interventions. ANT unpacks expert knowledge in all its socio-*materiality*. That is, ANT pays close attention to the fact that the production of expert knowledge depends on, and is intertwined with, the material environment, for instance, of the laboratory including instruments, devices, model organisms, etc. Polycentric governing, too, requires material artifacts such as data sheets, computer models, or indicators (Leander 2021). Thus, expert knowledge always has an ideational and a material component.

I elaborate on the ANT perspective by examining three instances of polycentric governing. First, the chapter elaborates on the novel techniques of governing-by-expertise such as certification schemes. Second, inquiring into forms of power, the chapter examines how science-policy networks generate and fix knowledge about global environmental problems. In

so doing, these networks engage in "ontological politics", normalizing certain constructions of reality and in the process excluding other actors and other governing logics (Mol, 1999). Third, a vignette regarding the United Nations Security Council elucidates the politics of legitimation when US Secretary of State Colin Powell tried to convince the world of the existence of weapons of mass destruction in Iraq. This case exemplifies how legitimation closely connects with practices of evidence making. Before exploring these three vignettes, I more generally situate ANT in relation to polycentric governing.

## Sensibilities and Commitments for Studying Polycentric Governing

The introduction to this volume speaks of polycentric governing as a "transscalar, transsectoral, dispersed, variable, messy, elusive, headless mode of governing" (Gadinger and Scholte, this volume). Where to begin, when governing authority cannot be located exclusively in the Weberian bureaucracy? The institutionalists in this volume handle this question by examining how nonstate actors interact with existing governing frameworks of nation-states and international organizations (see Thiel, Quack, Zelli, this volume). Feminist scholars develop ideas of polycentrism by focusing on issues of intersectionality (see Marchand, this volume). For Bourdieusian accounts, polycentric governing is understood with reference to the 'field' that surrounds an issue such as security and, for instance, practices of private military companies (see Gadinger, this volume).

ANT starts from a different, rather provocative suggestion for examining polycentric governing: *follow the actor.* That actor might be scallops (Callon, 1986), scientists and microbes (Latour, 1983), patients (Mol, 2002), or participatory devices (Marres, 2012). ANT says: follow the actors involved and trace how they associate with one another in actor-networks. In doing so, ANT scholars expand who partakes in governing beyond institutions. Not only states, NGOs, or international organizations are relevant actors for ANT, but also various objects and devices, viruses and algorithms can 'govern'. All of these candidate 'rulers' are considered when describing the formation of networks of governing.

'Translation' is ANT's crucial term here. It explains the mechanisms by which actor-networks are constituted and formed (Callon 1986). ANT scholarship emphasizes the ongoing translational work of bringing diverse actors into relation with one another. Richard Freeman notes, "what is significant about this process is the way in which a new relationship (or 'actor-network') changes the properties or characteristics of those things or people party to it. Such relationships are not essential or given: they have to be made and maintained, or 'performed'" (Freeman, 2009: 435). For polycentric governing, this means to pay attention to the *process of creating networks* and the politics involved.

The social – including the process of governing – is not a given condition, but an ongoing accomplishment: to be social is to associate with multiple actors in a full range of material forms (Law and Singleton, 2014). In other words, ANT views much of the political structure such as the state, NGOs, or international norms not as fixed ontological entities; they are constantly evolving through the translational practices that connect them. To make sense of this point, recall that ANT has its roots in microsociology. In this scholarship, the unit of analysis

is not institutions, social structures or discourses, "but the daily affairs and the people [and things] who conduct them" (Powell and Rerup, 2016). More than any of the other approaches addressed in this volume, ANT researches governing where it is *enacted*, and mistrusts even practice-oriented structures such as 'the field' or 'habitus' (see Gadinger this volume on these Bourdieusian concepts).

Thus ANT teaches radical empiricism. It abstains from ordering the mess of polycentric governing through some overarching explanatory formula that would guide the researcher through a complex world. Instead, ANT suggests to start the inquiry on the basis of uncertainty about the phenomenon in question: its boundaries and its ontology. Similar to ethnomethodology, ANT stays with (indeed embraces) the trouble of empirical messiness, giving voice to actors and their concepts rather than imposing an a priori explanatory framework. Refuting the abstract theoretical constructs of most social theory, ANT aims for an "*infra* language", a "reflexive account of what" actors are saying (Latour, 2005: 49).

As ANT follows the actors, it recognizes that governing can be found at many sites that may be strangely connected through various actor-networks. A good example is a study, *Plastic Water*, in which the authors examine a bottle of water's simultaneous existence as, among other things, a product, a personal health resource, an object of boycotts, and a part of accumulating waste matter (Hawkins et al. 2015). Polycentric governing appears, for instance, when commercially supplied water bottles replace the state provision of safe water and de facto transfer the role to beverage companies. So, follow the actors and you will find out about polycentric governing in action.

Another key proposition of ANT is captured in the aphorism that *science is politics by other means*. Already early ANT scholarship, while inquiring into practices of "laboratory life" (Latour and Woolgar, 1979), was interested in how science fundamentally influences social and political order (Jasanoff, 2004). It does so by creating and defining many of the problems that then require governing. ANT pioneer Bruno Latour explicates this argument in a seminal article where he describes the chemist Louis Pasteur not as an isolated scientist discovering pasteurization, but as a socio-political innovator (Latour 1983). Pasteur's laboratory is able to transform French society by convincing farmers, public health advocates and the wider public of a new actor – the anthrax virus – that kills cattle and can only be detected in his laboratory. However, detection with the help of laboratory techniques and instruments is not enough. Pasteur's laboratory also provides a cure to the problem, pasteurization.

For polycentric governing, this example holds the insight that we live in times of high scientization. $CO_2$ emissions and micro-plastic in drinking water are instances where only scientific methods can identify what otherwise remains unseen. ANT underlines that expert knowledge pervades our social and political life. For this reason, polycentric governing already begins when scientists, be they natural or social researchers, publish their evidence and frame it as "matters of concern" (Latour, 2004). Thus, ANT refuses to accept as given the consensual knowledge of an "epistemic community" (Haas, 1992). Instead, it treats the construction of expert knowledge as a political process in which some knowledge claims are rendered

authoritative, and others recede into the background. Science co-produces the world we live in: it is a form of governing.

Finally, ANT has acute sensitivity for the *politics of scale*: that is, how scale, level, and space produce political effects. For ANT, the politics of scale starts by taking a microscopic gaze into laboratory practices. The study of these micro-situations allowed early ANT scholars to "hear the macro order tick" (Knorr-Cetina, 1981: 42). Bruno Latour and Michel Callon (1981) reframed this seemingly epistemological problem into one of ontology, asking how it is possible that micro-actors become macro-actors. The central claim is that in the experimental system – the paradigmatic working unit of modern science – researchers reduce and simplify part of the macro-cosmos (the world) into the micro-cosmos (the experiment). Scientists translate the messiness of reality into an experimental system that allows for productive working, and then translate their findings back into society (Callon et al., 2009).

ANT thereby shares the polycentric premise of micro-macro connections. For instance, a recent volume on polycentricity observes that experimentation "is likely to facilitate governance innovation and learning about what works" (Jordan et al., 2018: 16). ANT, being always concerned with the construction of experimental settings, points to the politics of doing experiments and draws "attention to the fact that in real world contexts, experiments are likely to be shaped by asymmetric power relations" (Voß and Schroth, 2018: 100). In other words, innovation labs and real-world experiments are modes of governing, of presenting micro-solutions for problems that do not necessarily arise from public discourse, but rather are staged by policy innovators. Scaling up micro-solutions is a constant theme of governing innovation. From an ANT perspective, this process deserves attention, because it is a specific technique of polycentric governing – and one that involves politics.

**Techniques: Governing by Expertise**

It is early in the morning; you draft a few thoughts in your diary. Most likely, the paper on which you write, the coffee that you have freshly brewed, and even the shirt that you wear have been subject to governing efforts. Private certification schemes formulate standards for sustainable forestry (your diary) and agriculture (your coffee) or they aim at protecting workers' rights in the garment industry (your shirt).

Certification instruments now pervade our daily life. As a rather novel technique of governing, they belong to a group of policy instruments that are market-based, voluntary and distinct from those of the Weberian nation state, as they do not draw on government authority. The most respected standards are those that are created in so-called 'multistakeholder' collaboration between NGOs, firms, participants from the Global North as well as the Global South, due to the expertise that each of the involved parties holds. While expertise used to be (and much of it still is) coupled to state bureaucracy, it is also the most distinct source of authority for novel techniques of governing (Green, 2014). Certification schemes, sustainability indicators, CO2 emission trading systems, university rankings, or financial rating systems are all examples of governing instruments that people trust (or are meant to trust) because of expertise and technical knowledge.

ANT is suspicious of a narrative that views expertise as technical and consensual, as simply supporting the authority of polycentric governing. Instead, this perspective asks how it is possible that private expert knowledge is rendered publicly authoritative. More particularly, what are the struggles over these knowledge claims? In this regard, Andrew Barry mobilizes the notion of "transnational knowledge controversies": namely, "continuing disputes about the causes and existence of the problems that governance is supposed to address … including controversies about the operation of the governance mechanisms set in place" (2012: 325). While expert knowledge is often associated with "consensual knowledge" that ends uncertainty (Haas, 1992), ANT empirical studies suggest otherwise: controversies in science are often ongoing and do not come to an end because of a more rational argument (Latour, 1987). Instead, constant drivers of scientific research include detecting mistakes in the work of others, developing competing hypotheses, and applying new methods. Scientific consensus exists on certain aspects, but the advancement of science is less interested in them and more interested in the contested areas. Controversies are the lifeblood of scientific knowledge construction. For this reason, ANT scholars speak of 'closure' when scientists temporarily manage to stabilize knowledge claims. Conclusions made by the Intergovernmental Panel on Climate Change (IPCC) and reports issued by the National Academy of Sciences (NAS) in the US are instances of the closure of knowledge controversies. As such, they require careful maneuvering and stage management (Beck, 2012; Hilgartner, 2000). Latour (2004) has clarified that this view on scientific research does not mean to refute scientific facts such as climate change, but insists on investigating empirically why and by which means "matters of concern" come into being.

Going beyond the secluded spaces of science, reaching closure on controversial issues does not become easier. Consider the case of forestry certification and think of a situation where indigenous peoples sit together with representatives of the logging industry to discuss human rights violations. Whose voice and experiences are deemed relevant, and whose evidence counts when setting universal standards? While the institutionalist literature does not deny conflicts between diverse actors, it tends to overlook the specificity of knowledge claims and the potential for contestation (but see Quack, 2016). For ANT, expert knowledge in polycentric governing is plural, with each truth claim situated in a specific context and community (Haraway, 1988). Hence the most interesting question is what happens when diverse actors "disagree about the immensely varied facts that are relevant" when creating arrangements of governing (Martello and Jasanoff, 2004: 16). Expertise, in this account, is not an objective tool of governing, but a site of politics.

Thus far I have shown how ANT calls for unpacking expertise in polycentric governing because of its highly contested nature. More fundamentally, the new techniques represent a shift not only in ways of doing governing, but also in ways of "knowing about governance" (Voß and Freeman, 2016). Recall that knowledge about governing used to be restricted to the state bureaucracy; it co-evolved with nation-building and large infrastructure projects (Scott, 1998). However, if governing is no longer situated solely in state bureaucracies, then other actors beyond government officials acquire standardized knowledge about governing. Recent scholarship has paid close attention to the increasing professionalization of new governing techniques as well as to the 'new governors' – experts equipped with standardized governing

knowledge who move between private and public institutions (Beck and Strassheim, 2019; Voß and Freeman, 2016).

An intriguing example is the rise of behavioral governing techniques, including the specific technique of 'nudging'. 'Nudges' aim to "steer people's behaviour … mostly by re-designing the decision-making environment" (Straßheim and Beck, 2019: 3). For instance, cafeterias are given new layouts that encourage people to eat less junk food. A key ANT argument is that nudging measures can be viewed as "instrument constituencies" which "become 'entrepreneurial' solutions that actively seek to nurture demand and give shape to policy problems" (Simons and Voß, 2018: 16).

According to this view, many governing efforts around the world are not necessarily problem-oriented, but solution-oriented. That is, the new governing experts promote a set of governing practices that often exist independently of the problem to be governed. Take again the example of nudging units, which are heralded as instruments to change societies toward a healthier or more sustainable lifestyle by steering individual behavior. Even before the effects of a particular nudging measure have been evaluated, commercial and governmental actors invite nudging experts to apply the experiments in other areas (Straßheim and Beck, 2019). Thus, governing experts look for problems that allow their instruments to be probed and possibly refined, but first and foremost promoted. The technique becomes an end in itself.

This knowledge about governing techniques co-produces political order. The instruments do not necessarily "test already existing conditions of governing, but actively transform such conditions" in a way that they fit the instrument (Voß and Simons, 2018: 213). In sum, ANT claims that science is always fundamentally involved in creating structures of governing. For this reason, the interesting question is what kind of knowledge – from whom and for whom – becomes translated into mechanisms and techniques of governing. ANT is particularly adept at unpacking 'governing by expertise', as this approach has evolved alongside conventional modes of governing rooted in the Weberian nation state. ANT thereby makes visible the politics of behavioral governing techniques that often hide behind a rhetoric of problem-solving.

**Power: Ontological Politics**

How do science, art, and politics create the categories through which we understand the world? To highlight climate change, for example, does it need a single prominent advocate, such as the youth activist Greta Thunberg? Is it necessary that science speaks with one voice on ecological developments, or is a multiplicity of voices better equipped to respond to the local needs of those who are directly affected by the consequences of climate change or biodiversity loss? For ANT, these complex issues point to an understanding of power as lying in, and emerging from, the relations between actors, in particular how those relations make and fix categories and meanings.

An ANT perspective on power builds on the concept of productive power as it has been introduced by Foucauldian scholarship. On these lines Barnett and Duval argue that "to attend to the analysis of productive power is to focus on how diffuse and contingent social processes produce particular kinds of subjects, fix meaning and categories, and create what is taken for

granted and the ordinary of world politics" (Barnett and Duvall, 2005: 56). Recall that ANT does not take relations between actors as given, but rather investigates how the making and maintenance of relations requires ongoing work. These connections are never accomplished, but always unfold in an ongoing process.

Power for ANT involves actors' ability to translate ideas, objects, and materials that are otherwise discrete into a relationship of equivalence, thereby creating an actor-network (Best and Walters, 2013; Callon, 1986). Since ANT takes non-humans into account, the question arises how to combine, for instance, entities such as 'a forest' into a governance arrangement to fight climate change. The making of equivalences means here to turn the forest into an amount of carbon storage that can then be traded at the carbon market. This translation requires one to reduce the complexity of a forest and to focus only on its ability to store carbon. The forest is represented as a number; it is turned into an object of governance (Berger and Esguerra, 2018). Thus, entities have to be translated (transformed and transported) so that they fit into an emerging network. For ANT, this is an exercise of power.

Once entities have been transformed, it requires further power to establish networks in which a host of objects become related to each other. Take the example of coal. In Europe, coal used to be far more than a resource for energy supply. It was connected to an entire culture of work and leisure, of drinking beer and watching soccer, of fighting for workers' rights and of creating the wealth of a nation. With the shift of energy sources away from coal, this complex network falls apart. New networks have to be established that link what has become disparate. Artwork fills former breweries, hoping to attract the start-up scene. Industrial areas are turned into spaces for recreation and consumption when an artificial lake floods the traces of an industrial past. While in some regions this transformation succeeds, in other regions the newly established relations are not resilient.

The example of coal regions is indicative of ANT's interest in the fragility of the relationships that constitute objects of governance. The durability of networks always depends on the agency of human and non-human actors. This agency "is often truculent, recalcitrant, crafty, and self-interested" and "never unfolds quite as planned", so that more often than not people and things resist the establishment of new networks (Best and Walters, 2013: 333). Then, the lakeview apartments do not provide new homes for the former coal worker families, and the art galleries remain empty. While Foucauldian and Bourdieusian approaches have the tendency to emphasize the reproduction of structures (see Beckmann and Gadinger this volume), ANT is especially sensitive in its empirical studies to creativity and change, to difference and disobedience. Structural power remains a weak spot in ANT writings, partly because many of the foundational texts focus on elite actors without attending to their power within society as a whole.

Another aspect of power in ANT relates to Annemarie Mol's notion of "ontological politics". Earlier examples have shown that networks can be knotted in different ways. Thus, "the reality we live with is one performed in a variety of practices. The radical consequence of this is that reality itself is multiple. An implication of this might be that there are options between the various versions of an object" (Mol, 1999).

While this point may sound deeply philosophical (which it is), it is also a real-world problem for practitioners who design new institutions. Take the example of the creation of the Intergovernmental Science-Policy Platform for Biodiversity and Ecosystem Services (IPBES). Around 2010 a multistakeholder initiative negotiated how diverse knowledge systems could be incorporated in an institution that would forcefully make visible the loss of biodiversity worldwide. The negotiating actors included scientists, conservationists, indigenous peoples' organizations, multilateral environmental institutions and, not least, state representatives. During the negotiations it became clear that the diverse actors held different notions of 'biodiversity'. They not only practiced research differently, depending on disciplinary origins, but also experienced biodiversity in contrasting ways.

With Mol, we can indeed say that competing options of an object, biodiversity, were present in the negotiations. Science-policy institutions are sites where these options are made and fixed. In the IPBES case, one of the most vivid controversies pitted concepts of "ecosystem services" against those of "mother earth" (Borie and Hulme, 2015). In fact, IPBES has developed a conceptual framework that allows both framings to be true. Color coding in the framework uses blue for Mother Earth and green for ecosystem services. It remains to be evaluated how these "contrasting rationalities, diverging ontological claims, and different criteria for knowledge validation" play out in practice (Löfmarck and Lidskog, 2017: 28). Thus, ontological politics describe the struggle of realizing one truth claim against another. Power is the ability of actors, institutions or networks to represent and circulate a specific version of reality. Marieke de Goede has shown that such practices extend the realm of environmental governance. Drawing on Latour, she mobilizes the notion of "Chain of Security" in order to "conceptualize the ways in which security judgements are made across public/private domains" (de Goede, 2018: 27). ANT unpacks the practices of knowledge production, examining which (and whose) reality is turned into governing.

Like 'biodiversity', the object 'climate' also exists in many versions. For instance, Bentley Allan (2017) investigates how the climate came to take on a geophysical rather than a bioecological form in global governance, because it emerged from interactions between states and scientists. Had other actors been involved, the conception could have been different. Ontological politics draws our attention to the "competing, contested representations of the climate in the scientific literature and a variety of ways to translate them into governance arrangements" such as the IPCC or the UNFCCC (Allan, 2017: 131). For ANT, attending to heterogeneity is a central commitment, because alternative truths may challenge existing arrangements of governing (Marres, 2019).

To conclude this section, ANT focuses on the power of 'making present' by creating relations and representing objects. We see these processes in the techniques described earlier, such as certification schemes, indicators, and rankings. The power of these techniques is so subtle that we hardly realize the effects. The power of actor-networks makes it 'obvious' to think of biodiversity in terms of "ecosystems services" and the "values" that nature provides to humans. Measuring such services and translating them into policy instruments (such as rankings of green cities) creates political order. Thus, science and other actors produce "objects that are amenable to certain specific governance logics and which attract and privilege certain groups of actors"

and "inevitably exclude other actors and other governance logics" (Turnhout, 2018: 366). In other words, power is at play in the ontological politics of polycentric governing, in choosing certain options and discarding competing visions of the world.

**Legitimacy: The Politics of Legitimation**

This chapter has examined sites of politics that are mostly far away from traditional state-based centers of power. Indeed, the notion of polycentricity points to the governing effects around the world of municipal authorities, public-private partnerships, and standardization agencies (Jordan et al., 2018). Yet all is not decentred, and any convincing account of governing must speak also about those centers of power that do exist. For this reason, I turn to the United Nations Security Council (UNSC) and examine the politics of legitimation when it discussed the Iraq War in 2003.

On 5 February 2003 the UNSC debated a question of evidence around Iraq's possession of Weapons of Mass Destruction (WMD). The US administration "insisted that Iraq had used the absence of international inspectors to rebuild its illicit nuclear, chemical, and biological weapons programs" (Miller, 2007: 336). In contrast, inspectors from the International Atomic Energy Agency (IAEA) and the UN Monitoring, Verification, and Inspection Commission (UNMOVIC) persistently argued that the "existing evidence was inconclusive regarding Iraqi possession of WMD" (Miller, 2007: 336). In this situation, the US Secretary of State, Colin Powell, mobilized audiotapes and satellite images, which he tossed on the wooden desk of the UNSC to proclaim that '[w]e know that Saddam Hussein is determined to keep his weapons of mass destruction; he's determined to make more' (Powell, 2003).

For an ANT-inspired analysis, legitimacy does not derive simply from normative principles that formulate ideal legitimacy criteria and then test concrete situations in light of these criteria. Instead, the UNSC example illustrates the *politics* of legitimation. The premise of such politics is that actors seek to justify their practices through contrasting legitimacy claims that are tested under conditions of uncertainty (Gadinger, 2016). For Reus-Smit, actors "making legitimacy claims is the lifeblood of the politics of legitimation, and such politics is essential to the cultivation and maintenance of an actor's or institution's legitimacy" (Reus-Smit, 2007: 159). In other words, this perspective on legitimacy foregrounds controversy, contestation and uncertainty instead of formal routines and procedures. ANT specifies the politics of legitimation with regard to knowledge and evidence as well as the fragility of legitimacy claims involving objects of expertise.

For ANT, knowledge and evidence play a decisive role in legitimation politics. As the UNSC dispute illustrates, controversies about 'the facts' are an integral part of world politics. Evidence that actors judge to be conclusive can lead to legitimated military interventions supported by international law. Expert knowledge is also the basis for legitimated international environmental treaties such as the 2015 Paris Agreement on climate change. ANT-inspired scholarship has explored the making of evidence and the politics of legitimation involved. For example, Christian Bueger has conceptualized the "epistemic infrastructures" of piracy, in which "knowledge is generated and stabilized and its flow maintained" (Bueger, 2015: 15).

Likewise, the dispute at the UNSC can be conceptualized as part of the epistemic infrastructure of WMD. This infrastructure connects various sites of knowledge generation and negotiation such as the IAEA, US intelligence briefs, and the UNSC meeting. In this actor-network, the IAEA presents what Latour calls a "centre of calculation", where scientists and others turn collected probes, transcribed interviews, and other pieces of material into evidence (Latour, 1987). Secluded from the public eye, such centres create an aura of impartiality. In contrast, the Security Council meeting presents a video-streamed performance in which actors compete over recognition of their respective knowledge claims. This public role was also new for the IAEA, which normally reports to states and diplomats directly and confidentiality. Performing a controversy under the "public microscope" (Beck, 2012) was largely untested ground for the IAEA.

The dispute at the Security Council exposed fragility and objectual practices. Even though the US is the most powerful state, the knowledge practices of the IAEA, their tireless collection of evidence, weighed heavily on Colin Powell. Thus, to stage his claims, Powell mobilized objects of expertise (satellite images, audio tapes) to create a robust manifestation of his evidence. Two outcomes were possible: either these objects could achieve a high degree of "object-ivity" (Knorr Cetina, 1997), providing proof of the existence of WMDs, or, the objects could include speculation and only pretend to be a solid basis for future action.

This is ANT's home turf: the micro-politics of expert knowledge materialized in objects and publicly performed in a locally situated setting that is broadcast globally. Despite the US' powerful position, other members of the Security Council remained sceptical about the evidence. Nevertheless, nationally within the US the media coverage temporarily created enough support for an invasion. The controversy continued when scientific "teams from the United States followed literally on the heels of frontline troops in a massive search for Iraqi WMD in the first few months of the war" (Miller, 2007: 336). Like the inspectors of the IAEA before them, the US teams too could not establish any proof of WMD, which contributed to the global delegitimization of the US-led invasion in the years that followed.

Coupling legitimacy to evidence occurs not only in high politics, as described above, but also in quieter venues of polycentric governing. For example, policy assessments or development indices are used as tools to counter interest-based politics with more 'rational' and 'objective' forms of governing through 'transparent' and 'effective' problem-solving. In this vein, environmental assessments have developed scenarios for transformative change that integrate scientific evaluations with visions of future social order (Beck and Forsyth, 2019). Some of these scenarios include climate engineering techniques whose outcomes are highly uncertain (Reynolds, 2018). These examples show that legitimation of policy can happen without explicit normative claims or political fights, but through the deployment of seemingly neutral objects of expertise (Rüb and Straßheim, 2012).

In sum, ANT examines questions of legitimacy in polycentric governing with a particular focus on controversies around evidence claims. This approach raises issues about the democratization of science: i.e. asking "how, and with which perspectives, objectives are set by whom and on what legitimacy" (Beck and Forsyth, 2019: 56).

**Conclusion**

The concept of polycentric governing proposes that world politics involves a proliferation of centres of authority that are formally independent and yet practically interrelated. This volume examines polycentric *governing* instead of government or governance to cast the eye beyond institutions. We therefore also explore the "dynamic-process quality of societal regulation", including "underlying power relations and complex legitimacy dynamics" (Gadinger and Scholte, this volume).

An ANT-perspective fits comfortably with this emphasis on dynamism and process. As such, it is part of the family of practice theoretical accounts (Gadinger, this volume). Similar to much feminist and postcolonial scholarship, practice theory emphasizes the politics of everyday experiences of people and the ways that these experiences create routines and reconfigure power relations.

The distinct contribution of ANT to polycentric governing is to spotlight practices of socio-material knowledge construction. In particular, expert knowledge now lies at the heart of governing techniques, as seen with evaluation, accounting, and certification processes. Thus, ANT especially enquires into how, by and for whom expert knowledge is constructed and then performed. These crucial questions determine what counts as true and whose visions are translated into techniques of governing.

ANT underlines that performing authoritative claims about the world is a specific form of power. Representing the world according to dominant frames, practices and institutions reproduces existing order, while offering alternative imaginaries potentially reconfigures governing practices. Thus, an ANT perspective on polycentric governing examines the constant struggle over problem definition. This struggle is at its heart about legitimacy, as actors seek to justify the (knowledge) practices by which problems are constructed and solutions crafted.

ANT-inspired analyses of polycentric governing have followed actors to diverse sites of world politics. From central banks to piracy encounters, this scholarship has tried to stay close to the empirics, and, in the spirit of ANT, has avoided grand theorizing. These commitments have produced inspiring and carefully crafted case studies of polycentric governing, but not necessarily theories in the conventional sense.

By setting ANT alongside other approaches to polycentric governing, the present volume shows what ANT does (and also does not) offer. There is potential for cross-fertilization. For example, both feminist and post-colonial scholarship have stressed how the institution of science is structurally an imperial project mostly executed by white men (Haraway 1988). Such provocations can lead us to inquire how far global institutions incorporate and authorize different knowledge systems (Borie and Hulme 2015). However, in contrast to structuralist approaches, ANT has greater sensitivity for the fluidity of power and order, showing how dispersed sites of authority in polycentric governing struggle for recognition.

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