The Epistemology and Politics of Biodiversity Research

An Exploration in Political Philosophy of Science
on the Example of the
"Intergovernmental Science-Policy Platform on Biodiversity
and Ecosystem Services"

Von der Philosophischen Fakultät
der Gottfried Wilhelm Leibniz Universität Hannover
zur Erlangung des Grades
Doktor der Philosophie (Dr. phil.) genehmigte
Dissertation

von M.Sc. MPhil. Tobias Schönwitz

Erscheinungsjahr 2022

Referent: Prof. Dr. Torsten Wilholt, Institut für Philosophie, Leibniz Universität Hannover

Korreferent: Prof. Dr. Justin Biddle, Ivan Allen College of Liberal Arts, School of Public Policy, Georgia Institute of Technology´

Tag der Promotion: 22.06.2022

Abstract

In this dissertation, I study the intertwinement of science and society on the example of the *Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES)*. Inspired by the developments at IPBES, I attempt to develop a political philosophy of science which is able to incorporate the occurrence of conflict as both an inevitable and potentially constructive element in science and society. The kind of political theory that I chose for dealing with the political dimension of my project reflects this view: Throughout all chapters, I integrate epistemic considerations with so-called agonistic theories of democracy. Such theories provide ways for productively processing political conflict and a strong sensibility for the possible ways in which such productive forms of conflict in a society might be prevented.

Aside from an introdcution and conclusion, the dissertation consists of three parts. In chapter 2, I discuss the process of establishing IPBES and the role of the ecosystem services concept in this process. I introduce the notion of *particularities* as manifestations of values in science and society and distinguish between three kinds of particularities. Particularities present a challenge for accounts of democratizing science because they pre-structure the ground upon which democratic procedures take place, thereby creating advantages and disadvantages for groups with different value commitments. I argue that agonistic theories of democracy are well suited to deal with this challenge. They emphasize the importance of enabling the *contestation* of established structures and *cultivation* of the relationships between conflicting parties. For the case of IPBES, I derive specific recommendations for resolving value judgements in science such as involving the conflicting parties, being cautious with scientific tutoring and instead focusing on value disagreements first, as well as critically reflecting on what has been established scientifically so far.

In chapter 3, I describe how during the development of IPBES' conceptual framework, a conflict about IPBES' supposed approach to human-nature-relationships arose. As I argue, this conflict is due to proponents and opponents of the ecosystem services approach operating in different cognitive and normative frameworks. To further assess the influence of such frameworks, I study the work of Thomas Kuhn and Claude Lefort who focus on the influence of such frameworks on science and society (*paradigms*

in Kuhn's terminology, and *politics* in Lefort's). As I argue, Kuhn's and Lefort's accounts are similar, but due to their different stances on pluralism their views cannot be reconciled with each other. As an alternative to Kuhn, Helen Longino's pluralistic account of science and values can be used to interpret the developments at IPBES. However, her approach is challenged when trying to make sense of both the conflictual interaction and the influence of established particularities during the development of IPBES' conceptual framework. Longino's difficulties with these phenomena are due to her reliance on the political liberalism of John Stuart Mill. From the Lefortian perspective, Longino's account does not provide a neutral ground for dealing with values in science but is in itself a "form". This interpretation allows applying core concepts of Lefort's work to Longino's account, such as the distinction between *politics* and *the political*, the notion of a society's *generative principles*, or the idea of *divergences* between those principles and their actual representation in science.

In chapter 4, I describe how the development of IPBES occurred in three phases, during which processes of pluralization took place with varying degrees of success. I use agonistic thought to interpret these developments and, in particular, William Connolly's *responsive agonism* and Jacque Rancière's *oppositional agonism*. While the former emphasizes societal conditions which allow groups who are marginalized within a given status quo to emerge and become established on the societal landscape, the latter focuses on oppositional interventions of the marginalized for changing that societal landscape.

As I argue, elements of both approaches can be found in the case of IPBES. This analysis shows the importance of studying dynamic processes of pluralization in addition to static states of pluralism. Furthermore, an oppositional view on pluralization such as in Rancière's work has rarely been pursued in philosophy of science and provides a valuable enrichment of the academic debate.

Keywords: Values in science, biodiversity research, IPBES, political philosophy of science, agonistic democracy

Zusammenfassung

In dieser Dissertation untersuche ich Verflechtungen und Wechselwirkungen von Wissenschaft und Gesellschaft am Beispiel der *Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES)*. Inspiriert von den Entwicklungen bei IPBES versuche ich, eine politische Wissenschaftsphilosophie zu entwickeln, die in der Lage ist, das Auftreten von Konflikten sowohl als unvermeidliches als auch als potenziell konstruktives Element in Wissenschaft und Gesellschaft einzubeziehen. Die Art der politischen Theorie, die ich für die politische Dimension meines Projekts gewählt habe, spiegelt diese Sichtweise wider: In allen Kapiteln verbinde ich erkenntnistheoretische Überlegungen mit so genannten agonistischen Theorien der Demokratie. Solche Theorien bieten Möglichkeiten zur produktiven Bearbeitung politischer Konflikte und eine starke Sensibilität für Möglichkeiten, wie solche produktiven Formen von Konflikten in einer Gesellschaft verhindert sein können.

Neben einer Einleitung und einem Fazit besteht die Dissertation aus drei Teilen. In Kapitel 2 untersuche ich den Prozess der Gründung von IPBES und die Rolle des Konzepts der Ökosystemdienstleistungen in diesem Prozess. Ich führe den Begriff der *particularities* als Manifestation von Werten in Wissenschaft und Gesellschaft ein und unterscheide zwischen drei Arten von *particularities*. *Particularities* stellen eine Herausforderung für Ansätze einer Demokratisierung der Wissenschaft dar, weil sie das Terrain vorstrukturieren, auf dem demokratische Verfahren stattfinden und dadurch Vor- und Nachteile für Gruppen mit unterschiedlichen Wertvorstellungen schaffen. Ich führe weiterhin aus, dass agonistische Demokratietheorien gut geeignet sind, mit dieser Herausforderung umzugehen. Sie erarbeiten insbesondere Wege, um Anfechtungen etablierter Strukturen zu ermöglichen und gleichzeitig die Beziehungen zwischen Konfliktparteien zu pflegen. Für den Fall von IPBES leite ich spezifische Empfehlungen ab, wie z.B. die Einbeziehung von Konfliktparteien in Entscheidungsprozesse, Zurückhaltung bei wissenschaftlichem *Tutoring* zugunsten einer Konzentration auf Wertunterschiede sowie kritische Reflexion dessen, was bisher wissenschaftlich etabliert worden ist.

In Kapitel 3 beschreibe ich, wie während der Entwicklung des *conceptual frameworks* von IPBES ein Konflikt über den konzeptionellen Ansatz zu Mensch-Natur-

Beziehungen aufkam. Ich argumentiere, dass dieser Konflikt darauf zurückzuführen ist, dass Befürworter und Gegner des Ökosystemdienstleistungsansatzes in unterschiedlichen kognitiven und normativen Rahmen operierten. Zur weiteren Beurteilung des Einflusses solcher Rahmungen untersuche ich die Arbeiten von Thomas Kuhn und Claude Lefort, die sich auf deren Einfluss auf Wissenschaft und Gesellschaft konzentrieren (*Paradigmen* in Kuhns Terminologie und *Politik* in Leforts Terminologie). Ich erarbeite, dass Kuhns und Leforts Darstellungen einander ähnlich sind, aber aufgrund ihrer unterschiedlichen Auffassungen von Pluralismus nicht miteinander in Einklang gebracht werden können. Als Alternative zu Kuhn kann Helen Longinos pluralistische Konzeption von Wissenschaft und Werten verwendet werden, um die Entwicklungen bei IPBES zu interpretieren. Ihr Ansatz wird jedoch herausgefordert, wenn es darum geht, sowohl die konfliktreiche Interaktion als auch den Einfluss etablierter *particularities* während der Entwicklung des *conceptual frameworks* von IPBES zu verstehen. Longinos Schwierigkeiten mit diesen Phänomenen sind darauf zurückzuführen, dass sie sich auf den politischen Liberalismus von John Stuart Mill stützt. Aus der Lefortschen Perspektive betrachtet bietet Longinos Ansatz damit keinen neutralen Rahmen für den Umgang mit Werten in der Wissenschaft, sondern ist selbst eine „Form". Diese Interpretation erlaubt es, zentrale Konzepte aus Leforts Werk auf Longinos Darstellung anzuwenden, wie etwa die Unterscheidung zwischen *Politik* und *dem Politischen*, den Begriff der *generativen Prinzipien* einer Gesellschaft oder die Vorstellung von *Divergenzen* zwischen diesen Prinzipien und ihrer faktischen *Repräsentation* in der Wissenschaft.

In Kapitel 4 beschreibe ich, wie die Entwicklung von IPBES in drei Phasen verlief, in denen mit unterschiedlichem Erfolg Pluralisierungsprozesse stattfanden. Ich nutze erneut agonistisches Demokratietheorien, um diese Entwicklungen zu interpretieren, insbesondere den responsiven Agonismus von William Connolly und den oppositionellen Agonismus von Jacque Rancière. Während ersterer gesellschaftlichen Bedingungen betont, die es Gruppen, die innerhalb eines gegebenen Status quo marginalisiert sind, ermöglichen, diese Marginalisierung zu überwinden, konzentriert sich letzterer auf oppositionelle Interventionen der Marginalisierten. Wie ich darlege, lassen sich im Fall von IPBES Elemente beider Ansätze finden. Diese Analyse zeigt, wie wichtig es ist, neben eher statischen Zuständen eines Pluralismus auch dynamische Prozesse der

Pluralisierung zu untersuchen. Darüber hinaus ist eine oppositionelle Sichtweise der Pluralisierung, wie sie Rancière vertritt, in der Wissenschaftsphilosophie bisher nur selten verfolgt worden und stellt eine wertvolle Bereicherung der akademischen Debatte dar.

Schlagwörter: Werte in der Wissenschaft, Biodiversitätsforschung, IPBES, politische Wissenschaftsphilosophie, agonistische Demokratie

Table of Contents

Chapter 1
Introduction

1.1 Background and Context

This thesis is an exploration in political philosophy of science. It takes as its starting point the discourse on *values in science*, a debate which for a long time has been structured by reference to the *value-free ideal*. According to this ideal, scientific research should be kept free from so-called non-epistemic values such as social or political values. It has, however, been seriously challenged over the last decades. Philosophers have questioned whether it is actually possible for science to be value-free by uncovering different ways in which science is inevitably influenced and shaped by non-epistemic values: One line of reasoning holds that non-epistemic values shape concepts or the gathering of evidence due to a scientist's social situatedness and thus relation to her object of study (Haraway 1988; Longino 1990; Harding 1991; Wylie 2003). Along similar lines, it has been argued for the existence of an underdetermination of scientific theories by evidence which has to be resolved through value judgements (Longino 2002; Dupré 2012; Biddle 2013b; Alexandrova 2018). Furthermore, a variety of epistemically underdetermined methodological decisions have to be made during the research process which need to be resolved through value judgements. While this issue has been much discussed in the context of determining evidential thresholds for accepting or rejecting hypotheses, it has recently been expanded to more general methodological decisions in the course of research (Rudner 1953; Douglas 2009; Wilholt 2009; Elliott 2011; Steele 2012; Biddle 2016; Biddle and Kukla 2017). Crucially, all of these arguments emphasise the role played by values in science not only at the end but throughout the whole research process. Another line of reasoning has challenged the value-free ideal on normative grounds, questioning whether it should serve as an ideal for guiding science even though it might be unrealizable in actual practice (cf. Douglas 2009).

All of this has led to a more or less established consensus that non-epistemic values are an integral and legitimate part of scientific research. Consequently, attention has shifted to discussing how the role and influence of those values should be assessed (since not all non-epistemic values might be allowed to play a role in scientific research at any time) and, most importantly, how decisions about values in science can and should be

made (cf. Longino 2002; Douglas 2009; Wilholt 2009; Kourany 2010; Kitcher 2011; Elliott and McKaughan 2014; Intemann 2015; M. J. Brown 2020).

Taking this discussion on values in science as a starting point, I consider this thesis to be a thesis on the intertwinement of science and society, with the values in science framework being the approach predominantly used in *philosophy of science* to address this very intertwinement. Other fields such as *science and technology studies* (STS) or *political theory* have developed other approaches, terminologies, and frameworks for studying the same subject field and I have attempted a thesis which is informed by and includes such different theoretical approaches and perspectives. Making these perspectives speak with each other has turned out to be more difficult than I expected. But nonetheless, I am convinced that there is great potential in opening the doors of philosophy of science and welcoming other ways of thinking with curiosity and benevolence.

This being said, there are two particular approaches to the intertwinement of science and society that have structured the following work, a systemic approach and a political approach. The first approach takes up a systemic perspective. It considers value judgements in science to occur not in isolation and as individual events, but as embedded in a historically evolved, broader context which influences how such judgements are made and even whether they are consciously made at all. With such a perspective in mind, any proposal for dealing with values in science needs to pay attention to the conditions under which judgements are made and develop ways to compensate any structural or systemic influences on such judgements. A corresponding focus exists, for example, in the work of feminist philosophers of science who have considered knowledge as situated and therefore emphasized both the social context within which research is conducted and possible problems and imbalances arising from this. It can also be found within work in STS which deals with the intertwinement of science and society, most notably in Sheila Jasanoff's notion of *co-production* (cf. Jasanoff 2004b). While such approaches are usually not framed in the philosophical terms of the values in science debate, the applied perspective is nevertheless similar to the one I have in mind.

The second approach concerns the way in which normativity is treated within the values in science debate. Much of the work on values in science is concerned with analyzing how values influence scientific research and assessing consequences for the

epistemic dimension of scientific research. But there is also the question, what one *ought* to do about the occurrence of values in science and how trade-offs between social and epistemic matters *should* be resolved from a *normative* perspective. With this being a normative question, there are two broad ways of attempting two answer it, namely an approach grounded in ethics and another one grounded in political philosophy (cf. Schroeder 2020). Philosophers of science have approached values in science from both perspectives and each provides helpful insights. But in this thesis, I situate myself within the political approach. In one way, I consider this a matter of simple preference. While I do not wish to deny the value of assessing matters of values in science from an ethical perspective, it is simply not the perspective I wish to pursue for myself. But there is also a second reason for me to adopt a political approach to values in science.

I consider politics to be the way in which a group of people coordinates their living together. Since it is unavoidable that different opinions will exist with regard to the specifics of such living together, it is primarily a way of dealing with diverging opinions, mediating between them and finding ways to reach collectively binding decisions. Accordingly, I consider political theory as largely concerned with analyzing and developing procedures for managing dissensus. Because of that, I see a very practical advantage of political approaches to values in science over ethical ones: Even if a substantial ethical answer to a problem regarding values in science has been found, there is no guarantee of widespread agreement. Like most of philosophy, ethical discussions are characterized by a variety of conflicting approaches and arguments over which no final consensus will be reached. This creates a situation of diverging opinions and is thus exactly the kind of situation for which much of political thought attempts to find answers. Of course, one could argue that such a case of diverging ethical analyses should only be dealt with through assessing the intellectual merits of various arguments and reaching an appropriate, even though temporary, conclusion. But such an approach also constitutes a particular procedure for resolving an apparent dissensus, one that is quite similar to the exchange of reasons in John Stuart Mill's political liberalism or the ideal speech situation as envisaged by Jürgen Habermas. In my view, resolving ethical disagreements is thus a primarily political challenge.

Following up on such a commitment to a political approach, I observe that in philosophical research the development of what might be called a political philosophy of

science has so far often been conducted by drawing upon work from liberal political thought. A combination of philosophy of science and the political liberalism of John Stuart Mill, for example, has been pursued several times (see Longino 1990; 2002; Solomon 2001), which has even led Kristen Intemann to introduce the notion of *Millian science* as a shorthand for such epistemic-political-views (cf. Intemann 2011). Philip Kitcher, on the other hand, has developed a very influential approach of *well-ordered science*, which, as the name suggests, is strongly influenced by the political philosophy of John Rawls (cf. Kitcher 2001; 2011).

However, despite the undeniable strengths of political liberalism, I share some worries about liberal thought which have been expressed in strands of political theory labelled poststructural or postmarxist thought. Robin Celikates has grouped the corresponding arguments in four broad lines of critique: The *critique of rationalism* holds that the idea of a rational discourse which is free of power differentials is often either de facto presupposed or seen as a realizable and desirable ideal. The *critique of individualism* undermines the conception of an autonomous and rational subject and the methodological and normative founding role attributed to it. The *critique of normativism* aims at the assumption that universalistic norms and rational justifications can be kept free of overt and covert mechanisms of exclusion Finally, the *critique of consensualism* aims at the suppression of the constitutive role of conflict for political phenomena (cf. Celikates 2010, 274). Following up on these kinds of critique, within this thesis I have engaged more closely with a particular strand of political theory which takes up the worries articulated by Celikates, namely on agonistic theories of democracy. At the core of agonistic thinking is, first, a commitment to deep and far-reaching pluralism. As Ed Wingenbach (2011, 22) puts it:

> "The agonistic assertion is not that pluralism is fundamental but that pluralism is an unavoidable outcome of the human impulse to make meaning of a world that does not provide it. Thus pluralism is not itself an ontological fact, but it is an ontopolitical inevitability, insofar as the meaning making of human beings is never susceptible to closure. The possibility of new meanings always exists, and in any social order that is even remotely democratic this possibility will generate pluralistic conflict."

Agonistic thought is thus skeptical of any attempts at providing reasons or justifications with allegedly universal scope, instead considering any such positions to be particular and

themselves part of the political process. Such an understanding of politics stands in strong tension to, for example, conceptions of deliberative democracy of John Rawls or Jürgen Habermas who attempt to provide frameworks for conducting politics which are themselves withdrawn from the political process (cf. Mouffe 1999). It also follows from the agonistic view on democracy that any grounds or frameworks for conducting politics are themselves particular and contestable, which is why a primary goal of agonistic thought consists in theorizing democracy such that it „incorporate[s] into its regular practice the ongoing interrogation, contestation, and re-formation of the necessary but always necessarily incomplete and inadequate grounds of social and political life" (Wingenbach 2011, 12). This points at the second core commitment of agonistic thought. Building on the assumption of deep pluralism, agonistic thought takes political conflict to be inevitable, but also fruitful for a vivid democracy. Accordingly, it attempts not to eliminate such conflict, but to manage it in ways which can harness its potentials (for example, preventing lasting domination within a society) without leading to the destruction of opposing groups. In the following chapters, I will engage with various scholars from this school of thought such as Chantal Mouffe, James Tully, Claude Lefort, William Connolly, and Jacques Rancière and draw insights from their studies of societal and political issues for the debate on values in science and the intertwinement of science and society.

I develop these thoughts by considering a case study which exemplifies the influence values can have on the interplay between science and society, namely the establishment and development of the *Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES)*. IPBES has been established in 2012, but the process leading up to that started already in 2005. Its stated goal is to

> "provide Governments, the private sector and civil society with scientifically credible and independent up-to-date assessments of available knowledge for better evidence-informed policy decisions and action at the local, national, regional and global levels" (IPBES 2019, IV)

and it has often been labelled an "IPCC for biodiversity". However, throughout the which led to its establishment as well as its further existence, there have been conflicts revolving around IPBES' conceptual approach to biodiversity, mostly focused on a specific scientific concept, namely *ecosystem services*. This concept designates functions within

ecosystems which serve human well-being and has become increasingly established as a core concept for sustainability research and conservation efforts since the early 1990s. At the same time, it has been criticized as embodying an instrumental understanding of human-nature-relationships which is at odds with more holistic views on nature, found for example in some areas of the Global South. The case of IPBES thus exemplifies many of the aspects mentioned before and will serve as both inspiration and illustration throughout the following chapters.

1.2 Overview of the Chapters

This dissertation consists of three core papers, or chapters. Chapter 2, "Values in Science, Biodiversity Research, and the Problem of Particularity", takes as its starting point the observation that in recent years, accounts of democratizing science have been proposed to deal with the influence of social or political values on science. By infusing science with democratic measures, such accounts aim to provide procedures for resolving value judgements in science and thus guarantee that such judgements are democratically legitimized. In the chapter, I discuss a problem arising for such democratic accounts when established values privilege some actors over others, potentially leading to harmful lock-in effects or path-dependencies. I argue that during the process of establishing IPBES, ecosystem services and its related values were widely assumed to be the default choice for addressing biodiversity issues. Even when critics of ecosystem services opposed this narrow focus, they were in a weak position due to the multiple ways in which ecosystem services permeated the scientific and societal status quo. Right from the beginning, the terrain upon which all considerations on IPBES and how it was supposed to function took place was pre-structured by the earlier development. I introduce and develop the three-fold notion of particularity of epistemic resources, of scientific arrangements, and of societal arrangements to describe such materializations of value judgements and study how values are thereby inscribed in the very fabric of science and society.

Particular epistemic resources, scientific arrangements, and societal arrangements do not serve all value-perspectives evenhandedly and this non-neutrality influences supposedly democratic procedures in science. I state a corresponding problem of particularity, posed by the ways in which this interactive dimension of particularity might interfere with democratic accounts for resolving value judgements in science: If

established particularities in science and society influence democratic procedures used to resolve value judgements in science, the democratic legitimacy supposedly conferred upon them through those procedures can be undermined. Lock-in effects might occur, where the ways in which particularities are distributed and aligned make it easier for some and harder for other people to have their voices heard. In the IPBES case, this occurred when opponents of the ecosystem services concept attempted to broaden IPBES' scope. As a possible remedy I propose enriching accounts of democratizing science by agonistic theories of democracy – which emphasize the conflictual nature of society without giving up on the constructive potential of regulating such conflict.

In Chapter 3, "Paradigms and the Political: Assessing Epistemological and Political Perspectives on Biodiversity Research", I continue both the study of IPBES, and the exploration of combining philosophy of science and political theory. I describe the further development of IPBES' conceptual framework and show that it was (again) accompanied by dissensus about which concepts should be employed for conducting research on humans, nature, and their relationship. Two things can be observed here, namely that interaction between opposing parties in that dissensus was rather conflictual and that the context within which the whole conflict played out was (again) structured and shaped by established particularities. This motivates my subsequent discussion of accounts in philosophy of science and political theory which might be able to accommodate both observations – in the hope of combining such work into an epistemic-political account of scientific research.

Within philosophy of science, Thomas Kuhn is one of the most influential figures when it comes to the role and influence of mental or material frameworks within which research is conducted. As I argue, the case of IPBES' conceptual framework can be interpreted along the lines of his view on science. This implies considering the conflicting parties in the IPBES case to be rooted in different paradigms which influence and shape the way in which they conceptualize the world. To address the corresponding political dimension of the IPBES case, I turn to political theorist Claude Lefort. Lefort introduced a distinction between the two notions of *politics* and *the political* which can, as I argue, be understood as a political parallel to the Kuhnian distinction between *normal* and *revolutionary science*. After discussing various similarities between Kuhn's approach to science and Lefort's approach to society, I eventually argue against combining Kuhnian

and Lefortian thought, because the Kuhnian emphasis on monistic science does not fit well with the Lefortian emphasis on a pluralistic society. Consequently, I turn to a pluralist account of science, namely Helen Longino's combination of *critical contextual empiricism* and *social value management ideal*. After arguing that the case of IPBES can be interpreted along those lines, but also presents some difficulties for it such as the rather conflictual interaction during negotiations on IPBES' conceptual framework, I develop a Lefortian supplementation for Longino's pluralism as a potential remedy.

In chapter 4, "Pluralism and Pluralization at IPBES", I study the most recent phase of IPBES' evolution and discuss its overall development as a process of *pluralization*. As I argue, such pluralization is always occurring against the background of an established status quo and therefore exhibits an element of disturbance or maybe even contestation. As mentioned several times by now, theories of society with a similar focus have been developed under the rubric of *agonistic theories of democracy*, and consequently, I turn to two such theorists to discuss this process. William Connolly and Jacques Rancière both emphasize the importance of preventing a societal status quo from becoming frozen and thereby foreclosing any new (or existing, but marginalized) social groups to emerge. Both emphasize very different strategies to achieve such a prevention. Connolly's approach to pluralism has also been labelled as *responsive*, because he puts great focus on being attentive to marginalized or emerging social groups and their demands and perspectives. Rancière, on the other hand, emphasizes opposition and contestation of an established status quo as the primary means to change it. In doing so, Rancière also provides a way to link these discussions of societal pluralism and pluralization to scientific research. As I will argue, his notion of a *distribution of the sensible* can be imported to science by introducing the analogous notion of a *distribution of scientific resources*.

Studying the development of IPBES through the lens of Connolly's and Rancière's accounts, I argue that different aspects of their views on pluralism can be found within the three different phases of IPEBS' development. The last phase in particular, during which a modified conceptual framework based on the new concept *nature's contributions* to people was introduced, exhibits both aspects of an institutionalization of Connolly's virtue of critical responsiveness and the establishment of a new fault line within the modified distribution of scientific resources which might provide the locus of future struggles for inclusion and reconfiguration of said distribution.

Chapter 2

Values in Science, Biodiversity Research, and the Problem of Particularity

This chapter has been published as

Schönwitz, Tobias. "Values in Science, Biodiversity Research, and the Problem of Particularity." *Kennedy Institute of Ethics Journal* 32, no. 1 (2022): 69-101. doi:10.1353/ken.2022.0003.

Chapter 3

Paradigms and the Political: Assessing Epistemological and Political Perspectives on Biodiversity Research

3.1 Introduction

When in 2012 the *Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES)* was established, several states did not join out of protest about IPBES' reliance upon one particular scientific concept, that of *ecosystem services*. IPBES' establishment had already been preceded and was accordingly accompanied by a conflict about the scientific approach it would take towards the issue of biodiversity and relations between humans and nature, and the ecosystem services concept had been at the center of this conflict. The dissensus flared up again when later on a conceptual framework for IPBES' scientific work was developed, but this time the protesting states did manage to shift the scientific status quo and achieve a substantial broadening of the approach IPBES would take. These developments provide a vivid example of the intertwinement of science and society in epistemic and normative matters. They also provide an opportunity to study in parallel the ways in which such conflicts have been considered in philosophy of science and political theory, thereby addressing both the scientific and the societal dimension of said intertwinement. The main motivation of this paper consists accordingly in following this parallel and, more specifically, exploring the extent to which a parallel between the thought of philosopher of science Thomas Kuhn and political theorist Claude Lefort can be made fruitful for the example at hand.

In section 2.1, I study the development of IPBES' conceptual framework, describing how a conflict arose about which concepts should be employed within it. As I argue in section 2.2, this conflict can be understood as a dissensus about different value-laden frameworks for conceptualizing human-nature-relationships and, consequently, for conducting research. I use this as a starting point for inquiring into philosophical work on the role of such frameworks, beginning with Thomas Kuhn's notions of paradigms and paradigm change in section 3.1. As I argue, the Kuhnian account might be fruitfully applied to the case of IPBES and its conceptual framework but lacks conceptual resources to address the political dimension of this case. This leads me to turn to political theory in section 3.2 and explore the postfoundational view on society developed by Claude Lefort

as well as the possibility of combining Kuhnian and Lefortian thought in section 3.3. Eventually, I conclude that the Lefortian emphasis of pluralism does not fit well with Kuhn's monistic understanding of science and therefore turn toward more pluralistic theories in philosophy of science such as the one of Helen Longino (section 4.1). However, I will argue that her account also has difficulties to account for the observations made in the IPBES case (section 4.2) and that this might be helped by enriching it with some insights from the earlier discussion of Lefort (section 4.3).

3.2 IPBES and its Conceptual Framework

3.2.1 The development of IPBES' conceptual framework

The *Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES)* was established in 2012. It fulfills a somewhat similar role for biodiversity as the *Intergovernmental Panel on Climate Change (IPCC)* does for climate science in that it provides policymakers with assessment reports on the state of biodiversity research, but also engages in capacity-building, for example through fellowship programmes or funding of regional biodiversity research networks.

During discussions about the establishment of IPBES, the concept of *ecosystem services* became central for IPBES' approach to biodiversity. This concept dates back about 50 years but rose to larger prominence within sustainability science during the 1990s and early 2000s when it was employed in influential scientific publications, assessment report as well as policy measures. Put roughly, ecosystem services are nature's benefits to humans (cf. Millennium Ecosystem Assessment 2005b, v) in the sense that ecosystem services designate those functions within ecosystem which are of value to humans. For example, a forest absorbs CO_2 out of the air which is considered beneficial by humans due to the role of increasing CO_2 levels for global warming. Accordingly, the forest's filtering of air can be conceptualized as an ecosystem service. Ecosystem services are furthermore often valued in monetary terms by utilizing economic approaches to calculate their financial value. On the societal level, various so-called *Payment for Ecosystem Services* (PES) or *Market for Ecosystem Services* (MES) schemes have been introduced for conservation purposes with the idea being that creating a financial incentive for trading ecosystem services will contribute to the preservation of the

respective ecosystems (cf. Gómez-Baggethun et al. 2010; Kull, de Sartre, and Castro-Larrañaga 2015).

However, the ecosystem services concept is also regularly criticized and in the context of this paper, two lines of critique are of particular interest. First, it is argued that the ecosystem services concept implies an understanding of humans and nature as two distinct and rather separated realms. Instead of conceptualizing humans *within* nature or in their *intertwinement* with nature, the argument goes, ecosystem services imply an understanding of nature which focuses primarily on the instrumental dimension of their benefitting human well-being. Critics argue that such an understanding of human-nature-relationships is not only particular to mostly Western societies, it furthermore stands in contradiction with more holistic views on humans and nature found in many non-Western countries (cf. Sullivan 2009; Turnhout et al. 2013; Schröter et al. 2014; Barnaud and Antona 2014; Kull, de Sartre, and Castro-Larrañaga 2015). Second, the focus on economic valuation of ecosystem services is criticized as furthering a commodification of nature and thereby possibly even harming conservation efforts – a line of reasoning which is often accompanied by a more general critique of capitalist thought and practices (cf. McCauley 2006; Kosoy and Corbera 2010; Gómez-Baggethun et al. 2010; Gómez-Baggethun and Ruiz-Pérez 2011; Dempsey and Robertson 2012; Robertson 2012).

Due to its prominence in sustainability sciences and its widespread use in the policy realm, ecosystem services were adopted as a core concept for IPBES already in the early stages of its establishment. This became controversial when some states opposed the focus on ecosystem services, with countries such as the Plurinational State of Bolivia arguing "that the concept of ecosystem services did not reflect adequately [our] vision of the relationship between human beings and nature and would limit the focus of the platform's work" (UNEP 2011, 5). The Bolivian critique was primarily following the lines of critique just summarized, namely the instrumental understanding of nature and the focus on economic valuation of ecosystem services. However, the Bolivian intervention remained unsuccessful: In 2012, IPBES was formally established with a strong focus on ecosystem services and consequently Bolivia as well as some other states such as Venezuela and Egypt did not join it at that point in time.

A key task after its formal establishment was the development of a conceptual framework which would "provide common terminology and structure for the variables

that are of interest in the system of interest, and propose assumptions about key relationships in the system" (UNEP 2012b, 11). To that end, a workshop was organized where a first draft for a conceptual framework was developed and afterwards circulated to IPBES member states and other organizations. In line with the ecosystem services approach, the overall rationale behind this draft framework was that human well-being depends on ecosystem services, which in turn depend on biodiversity and ecosystem functioning. It thus created a direct line of reasoning from preserving biodiversity to maintaining human well-being through the concept of ecosystem services.

However, due to its emphasis on ecosystem services, the draft met strong resistance from Bolivia which had joined IPBES in the meantime as well as from some other states. They voiced concern that through the focus on ecosystem services the conceptual framework would implicitly endorse a position according to which "human beings are entitled to manage and to exploit nature in an anthropocentric view of development, so that nature and ecosystems must contribute to the achievement of the individuals' well-being" (Plurinational State of Bolivia 2013, 2). Bolivian critique followed again the lines which they had already (unsuccessfully) pursued during the establishment of IPBES: That they disagreed with the ecosystem services concept, because they took it as implying an instrumental understanding of nature and as furthering nature's commodification due to its economic framing. To reconcile the divergent positions a second workshop was organized which took place in Cape Town in August 2013. In preparation for this second workshop, the Bolivian delegation prepared an alternative proposal in which they both argued against the use of the ecosystem services concept and put forward their own proposal for IPBES' conceptual framework (cf. Plurinational State of Bolivia 2013).

The Bolivian proposal was built around the indigenous concept of *Mother Earth*, an entity which in Bolivia is officially recognized as "a dynamic living system comprising an indivisible community of all living systems and living organisms, interrelated, interdependent and complementary, which share a common destiny" (Plurinational State of Bolivia 2010, Chapt. II, Art. 3). Through the *Law of the Rights of Mother Earth* it is furthermore endowed with inherent rights, for example the right "to preservation of differentiation and variety of beings that make up Mother Earth, without being genetically altered or structurally modified in an artificial way, so that their existence, functioning or future potential would be threatened" (Plurinational State of Bolivia 2010, Chapt. III, Art.

7). The notion of Mother Earth had also had already been recognized in official resolutions, for example at the *Rio+20 United Nations Conference on Sustainable Development* where the states attending the conference committed themselves to

> "recognize that planet Earth and its ecosystems are our home and that 'Mother Earth' is a common expression in a number of countries and regions and (…) that some countries recognize the rights of nature in the context of the promotion of sustainable development" (United Nations 2012, 27).

Centered around the concept of Mother Earth, the Bolivians put forward a more holistic understanding of human-nature-relationships according to which nature has an intrinsic value instead of being only instrumental for humans and according to which human communities are explicitly considered to be a part of nature instead of being demarcated from the natural realm as implied by the ecosystem services concept.

The ecosystem services approach and the Mother Earth approach were characterized by rather different underlying worldviews and value commitments and the Cape Town workshop was supposed to reconcile these divergent positions. However, it became apparent that neither group was willing to give up their framing of human-nature-relationships, because both groups perceived the other as too political: Proponents of the ecosystem services concept argued that "the key drivers of this [the critique of ecosystem services, T.S.] are political and have a lot to do with the emergence of the promotion of indigenous knowledge systems particularly in parts of South America as a counter to what is seen as a western ideology" (quoted in Borie and Hulme 2015, 8), while opponents such as the Bolivians claimed that due to its emphasis of ecosystem services the conceptual framework "only represents the views, visions and approaches of the Western modern society and it is completely biased towards a particular vision of biodiversity which is the one related to the commodification of nature" (Plurinational State of Bolivia 2013, 2). The dispute was only resolved when both sides settled on a dualistic conceptual framework which would incorporate both the ES terminology and concepts more in line with the approach proposed by the Bolivian delegation (cf. Díaz, Demissew, Carabias, Joly, Lonsdale, Ash, et al. 2015; Díaz, Demissew, Joly, et al. 2015).

3.2.2 A conflict about frameworks

The clash between proponents of the ecosystem services approach and proponents of the mother earth approach was as a dissensus about non-epistemic values and about according frameworks: Both parties held different normative positions with regard to nature and the relationship between humans and nature. Consequently, they endorsed different frameworks for conceptualizing the world and thus argued for conducting science in different ways. Additionally, two observations can be made with regard to the particular way in which these two frameworks (or rather their proponents) met during the course of IPBES' establishment and further development. First, interaction between proponents of different frameworks was quite conflictual. Both sides rejected the other's perspective as too political and the decision to incorporate both perspectives in a dualistic framework was not a consequence of the exchange of critique and a mutual acknowledgement of the validity of both perspectives, but rather, as one interviewee stated, "[t]o some degree (…) a political solution because of, say, Bolivia" (quoted in Borie and Hulme 2015, 10), while another interviewee stated that "[i]t was that very powerful set of interventions from the Bolivians that really re-framed it" (Borie and Pesche 2017, 148).

A second observation is the influence of what previously has been introduced as *particularities*, i.e. manifestations of political value judgements in science and society (cf. Schönwitz forthcoming). The notion of particularities is meant to capture the ways in which value judgements in science can be substantially embedded in the cognitive and infrastructural fabric of science and society. Such particularities can arise in three different ways: First, *epistemic resources* such as scientific concepts, results or theoretical frameworks can be particular if they depend on specific values, i.e. if one has to endorse specific values to gain the epistemic resource in question. A value-laden concept such as ecosystem services is an example of such a particular epistemic resource because it presupposes a value judgement implying a rather instrumental understanding of nature. Second, *scientific arrangements* such as institutes, journals, or funding schemes are particular, if they favor the generation of particular epistemic resources. For example, a *Journal of Ecosystem Services* makes it more likely that scientific research related to ecosystem services gets published and thus favors its generation, making it a particular scientific arrangement. Lastly, *societal arrangements* such as established laws, norms, or

institutions are particular, if they depend on particular epistemic resources. For example, established PES schemes are particular societal arrangements since they conceptually depend on the ecosystem services concept. Particularities can be understood as manifested remnants of previous value judgements in science, but at the same time influence how further value judgements are made.

In the case of IPBES, many particular epistemic resources as well as scientific and societal arrangements existed which depended on the values intrinsic to the ecosystem service approach. On the level of epistemic resources, this comprised various specific ecosystem services as well as the overall classificatory system as a whole, thereby creating, as Borie and Hulme (2015, 8) note, "a strong pressure to maintain some epistemic consistency, most particularly with the classification of ecosystem services promoted in the MA [Millennium Ecosystem Assessment, T.S.]." Similarly, established particular scientific arrangements such as a journal of ecosystem services or scientific departments explicitly directed at researching ecosystem services provided a strong rationale for continuing to work in that direction. And lastly, societal arrangements such as established payment for ecosystem schemes made it much more likely that research based on the ecosystem services approach would find its way into the realm of policymaking.

All of these aspects are valid reasons for focusing IPBES on ecosystem services, but at the same time made it very difficult for people opposed to the ecosystem services approach to have their voice heard. During the development of IPBES' conceptual framework, there were more particular epistemic resources, scientific arrangements, and societal arrangements aligned with the ecosystem services approach than there were for the position of the Bolivian delegation. Consequently, the Bolivians were not able to argue with proponents of the ecosystem services approach at eye level – not because they were treated unequally in terms of intellectual authority, but because for contingent reasons there simply were more argumentative resources available to those they were criticizing. One might say that the ecosystem services framework was in a much stronger position than the mother earth framework employed by the Bolivian delegation.

3.3 Framing Science and Society: Thomas Kuhn and Claude Lefort

3.3.1 Thomas Kuhn and paradigms

When thinking about accounts in philosophy of science which deal with the issue of different frameworks for conducting science, the works of Thomas Kuhn come to mind almost immediately. Crucial element of the Kuhnian view is his notion of a *paradigm*, an idea which changed considerably both on a conceptual and terminological level throughout the course of his work. In the narrowest sense, paradigms are exemplary solutions to scientific problems which guide a scientific community. However, in his later works, Kuhn broadened this understanding considerably with the narrow conception of a paradigm remaining just one element of this broader conception. In its broad understanding, a paradigm comprises all the shared commitments of a scientific group such as criteria, methods, or values. Such a paradigm plays a constitutive role for a scientific community: According to the Kuhnian view, individual scientists acquire and hold their commitments to a paradigm or its elements by virtue of being a member in the respective scientific community. The shared commitment of the members of a scientific community to a paradigm is thus what binds them together and defines their group as being a scientific community. In addition to that, a paradigm shapes how its community perceives the world and conducts research in it. Kuhn stated that

> "the proponents of competing paradigms practice their trades in different worlds. (…) Practicing in different worlds, the two groups of scientists see different things when they look from the same point in the same direction" (Kuhn 1996, 150).

For Kuhn, both observation and the meaning of (theoretical) concepts are shaped by a group's paradigm which is why different paradigms lead to different perceptions of the world. To make sense of the Kuhnian claim of *different worlds*, one can thus distinguish between the world-in-itself which is perceived through a specific paradigm and a phenomena world as it is perceived in such a way (cf. Hoyningen-Huene 1993). On that interpretation, scientists have no direct access to the world-in-itself, but only to the phenomenal world which is jointly co-constituted by the world-in-itself and a paradigm. This is why

> "paradigm changes do cause scientists to see the world of their research-engagement differently. In so far as their only recourse to that world is through what they see and

> do, we may want to say that after a revolution scientists are responding to a different world" (Kuhn 1996, 111).

This introduces a third characteristic element of the Kuhnian account, namely a dynamic of scientific development according to which science takes place in alternating phases of paradigm-guided research (*normal science*) and destabilized phases of search for a new paradigm (*revolutionary science*). This alteration of phases is correlated with a social dynamic of the scientific community holding the paradigm in question. During the phase of *normal science*, the community has a stable consensus on a paradigm. However, at a certain point, the shared commitment and consensus starts to crumble, because *anomalies* arise which appear as not resolvable from within the paradigm. During the ensuing phase of revolutionary science, fundamental questions are asked, and elements of the paradigm are questioned which were otherwise taken for granted. This phase ends when either the existing consensus on the old paradigm is stabilized again, or a new paradigm emerges and takes hold, leading to another phase of normal science guided by a different paradigm.

How can such a view be helpful to address the issues arising in the case of IPBES? In the case of IPBES we saw, first, that different people were strongly committed to their respective frameworks. This fits well with the Kuhnian approach in which scientists are rooted in a scientific community which is partially constituted by a paradigm. On such a view, scientists working in the ES-framework and their opponents such as the Bolivians are rooted in different paradigms and corresponding worldviews. And since Kuhnian scientists are strongly committed to this paradigm, they are reluctant to question it and will not easily adopt another perspective which results in conflictual interaction as in the case of the development of IPBES' conceptual framework. Second, a paradigm has a counterpart in the institutional structure and social organization of its scientific community. In normal science, research is thus aligned towards the production of knowledge which fits with the respective paradigm. If the paradigm in question comprises political values, the corresponding normal science will thus entail particular scientific arrangements and generate particular epistemic resources. The way in which the institutional setting in the IPBES case was structured more strongly in favor of the ES approach can thus be understood as resulting from and connected to an overall predominance of the ES paradigm.

Framing these issues in terms of particularities does, however, point towards the importance of assessing these phenomena in their broader societal and thus political dimension as well and Kuhn himself did neither discuss political implications of his view on science nor incorporate an explicitly political dimension into it. And while he argued that values play an important role in scientific research and paradigm choice, he was primarily concerned with values such as accuracy, consistency, or simplicity and far less with those values which are classified as non-epistemic, namely social or political values. But even though he did not engage with political issues in detail, Kuhn after all mentioned that there is a "parallel between political and scientific development" and explicitly likened scientific and political revolutions to each other (Kuhn 1996, 93). To address these political issues, one might thus ask whether there is a more explicitly political account dealing with the role and influence of different frameworks which can be used to complement the Kuhnian view on science.

3.3.2 Claude Lefort and the political

Crucial aspect of Kuhn's account is a duality between phenomenal worlds and world-in-itself, but also between an established paradigm and the realm of possible but not (yet) instantiated paradigms. Science can thus be assessed in terms of the established paradigms and from a dimension which goes beyond that and allows for questioning and possibly replacing such established structures. It is this duality which allows for radical breaks in science's dynamics. At the same time, this duality allows to interpret disagreeing scientists as being rooted in different paradigms, or frameworks, as in the case of the proponents of the ecosystem services and mother earth approach, respectively. A supplementing political interpretation of such phenomena embodying a similar duality can be found in the works of postfoundational political theorists who accept the necessity to live by and within *foundations* which structure and coordinate societal life (analogous to a Kuhnian *paradigm* or the notion of *frameworks* used throughout this paper), while at the same time emphasizing their temporary nature and their possible overhaul and replacement by a different set of foundations (analogous to Kuhnian scientific revolutions). Central figure in this line of thought was the French philosopher Claude Lefort, who developed a distinction between *politics* (*la politique*) and *the political* (*le politique*) – a distinction which since then has been highly influential for postfoundational

approaches. For Lefort, *politics* refers to an institutionalized subsphere of society which comprises "competition between protagonists whose modes of action and programmes explicitly designate them as laying claim to the exercise of public authority" (Lefort 1988, 227), while *the political* is meant to go beyond that and address the institution of a society as a whole. One might thus compare *politics* to what is happening within a specific framework (or paradigm) and *the political* to the interplay of different frameworks.

Similar to the way in which Kuhn takes a scientific community to be no primordial community but rather co-constituted by a paradigm, Lefort argues against the idea of a primordial or 'natural' society. Instead, he claims "that no elements, no elementary structures, no entities (classes or segments of classes), no economic or technical determinations, and no dimensions of social space exist until they have been given a form." (Lefort 1988, 11f.) With this notion of a society's *form*, he basically refers to the overall organizational structure of a society, claiming further that different societies might exist in different forms. This plurality of forms of societies is possible, because for Lefort the form-becoming of a society is not reducible to a more fundamental reality such as a set of absolute normative principles or a deeper social structure (cf. Weymans 2005, 264f.). It is rather of a genuine social or political character. In this way, one of Lefort's key thoughts consists in characterizing a society as comprising a *symbolic* dimension which is co-constitutive of any *real*, i.e. factual, social order. This symbolic order, which Lefort also calls *the political* is "identified with the institution of the social, with the generative principles of its 'form'" (Lefort 2000, 226). But acquiring a form comprises more than just an organizational structure, since beyond that "the advent of a society capable of organizing social relations can come about only if it can institute the conditions of their intelligibility, and only if it can use a multiplicity of signs to arrive at a quasi-representation of itself" (Lefort 1988, 218f.).

The two further aspects mentioned here are what Lefort calls the sense giving in society (*mise en sens*) and the staging of society (*mise en scène*). They are parts of the forming of society (*mise en forme*) and together these notions are inseparable aspects of the symbolic, or political, institution of a society. This institution occurs in reference to what Lefort calls *generative principles* – abstract principles which "order, legitimize and give meaning and an identity to a factual social order" (Weymans 2005, 265).

Sense giving occurs in the way that "the social space unfolds as a space of intelligibility articulated in accordance with a specific mode of distinguishing between the real and the imaginary, the true and the false, the just and the unjust, the permissible and the forbidden, the normal and the pathological" (Lefort 1988, 11f.). Putting it in terms of Miranda Fricker (2007), this can be understood as a shaping of the collective hermeneutical resources of a society which are used by its members to understand and refer their experiences of social life and social practices to each other. But – to frame it a bit more in terms of values in science – sense giving can also be found in the shaping of a society's particular epistemic resources or even the ways in which people think (similar to Hacking's (1982; 2012) notion of 'styles of reasoning').

The idea of staging on the other hand refers to the idea that abstract generative principles on the symbolic level are not of a determinate reality which could simply be instantiated or mirrored in society. Rather, they acquire their role for society only through acts of representation, which for Lefort is an "*activity* of making symbolic principles work so that an entire society acquires meaning and legitimacy" (Weymans 2005, 266). He chooses the term *mise en scène* as an analogy to the construction of a theatrical stage – a process which involves the staging of a society's basic organizational structure. This staging thus provides society with the structure that we experience in its real dimension, and it is understood as a representation of a society's symbolic form to the society itself.

These three aspects together are Lefort's attempt to conceptually address the observation that there is inherent plurality and division in a society and at the same time a unity which nonetheless allows to understand it as *one* society. They allow for a society which "is organized as one despite (or because of) its multiple divisions and that it is organized as the same in all its multiple dimensions" (Lefort 1988, 225). However, since for Lefort these dimensions and divisions are real and still exist despite all representations of society as a unity, a society's form and staging are not possible without something maintaining them. This 'something' proves to be power, which is both institutionalized in a society's form (and thus comes into being through the institution of the particular form) and maintains its further existence. Phrasing it a bit differently, one could say, that power is located in the institutionalization (or staging in more Lefortian terms) of a society's form. This institutionalization of power in a society's form can vary from society to society, but for Lefort the democratic form has developed a very unique way

when it comes to dealing with it. In what he calls the 'democratic invention', the way in which power was staged and thereby constituting society's unity shifted. In the previous monarchic symbolic order, the power of the king

> "pointed towards an unconditional other-worldly pole, while at the same time he was, in his own person, the guarantor and representative of the unity of the kingdom. The kingdom itself was represented as a body, as a substantial unity, in such a way that the hierarchy of its members, the distinction between ranks and orders appeared to rest upon an unconditional basis." (Lefort 1988, 17)

However, during the democratic invention, a "mutation of the symbolic order" (Lefort 1988, 16) occurred during which the place of power which was previously substantially occupied by the king was recognized as being empty. Instead, a sphere of *politics* became established in which actors can compete to temporarily claim and exercise power – without ever being able to claim that they are consubstantial with the place of power as was the case for the king in the monarchic form. Power is thus still represented to society, but disconnected from other societal spheres such as law, knowledge, or religion – deriving its legitimacy purely through the democratic form of the society.

However, Lefort himself recognizes that "[t]he fact that something like politics should have been circumscribed within social life at a given time has in itself a political meaning" (Lefort 1988, 11). The fact that in a democracy politics is established as a social subsystem which aims at institutionalizing the empty place of power is itself part of the forming and staging of a particular and contingent symbolic form, namely the democratic form. This might sound paradoxical since it is obviously not possible to institutionalize an absence of lasting power without putting forward and upholding structures and institutions (and thus power) oneself. The democratic form might aim at disincorporating power, but how could maintaining its structures be possible without power? And how could that not violate its central principle of keeping the place of power empty of any lasting occupation? Resolving this paradox is possible by recognizing that institutionalizing something purely negative (like an absence of lasting power) is simply not possible. Aside from simply institutionalizing the empty place of power *as much as possible*, the democratic form thus aims at something else, namely the institutionalization of the recognition of its emptiness. "Groundlessness is openly staged in democracy" and

institutionalized by providing symbolic frameworks "which allow for the acceptance of interrogation, debate, questioning, and conflict as that which generates democracy", as Marchart (2007, 107) argues. This debate and questioning might thus always reach beyond established structures and institutions, since "modern democracy invites us to replace the notion of a regime governed by laws, of a legitimate power, by the notion of a regime founded upon *the legitimacy of a debate as to what is legitimate and what is illegitimate* - a debate which is necessarily without any guarantor and without any end" (Lefort 1988, 39).

Democracy thus aims at institutionalizing the place of power as empty without ever being able to fully achieve that. In Lefort's terms, there will always be a *divergence* between a symbolic order and its real representation in the sense that abstract generative principles never coincide with the social reality which is ordered by them (cf. Weymans 2005, 266f.). The divergence between democracy's underlying symbolic principle of leaving the place of power empty and the impossibility to establish that within the real can serve as an illustration of this. However, it is also this divergence, which, once recognized, allows for contesting any actual societal arrangements by reference to the generative principles which they are supposed to represent. Lasting power relations can be contested by reference to democracy's generative principle of allowing the place of power to be occupied only temporarily. And furthermore, there is a second divergence, namely between a society's inherent plurality and the unity conferred upon it through its form which nevertheless allows to understand it as *one* society.

Maintaining transparency about these two divergences is important, because recognizing the divergence between the real and the symbolic allows to contest the former in the name of the latter and recognizing the divergence between a society's represented unity and its factual divisions prevents an enforced societal conformity which can be found in totalitarian regimes. This recognition is, however, constantly endangered, because through the establishment of *politics*, the grounding role of *the political* is "obscured in the sense that the locus of politics (the locus in which parties compete and in which a general agency of power takes shape and is reproduced) becomes defined as particular, while the principle which generates the overall configuration is concealed" (Lefort 1988, 11). In other words, the process of instituting society has a concealing effect, if the subsystem of politics is considered to be *all there is* to political activity while

the role of *the political* as society's grounding dimension and condition for the possibility of a specific *politics* is forgotten.

However, in parallel to the political blind spot identified in Kuhnian thought at the end of the last section, there is a scientific blind sport in the works of Lefort. Lefort studied extensively how power and its staging shapes the *political* setup of society, arguing that in the course of the *democratic invention* science was liberated from the influence of power, because its disincorporation was

> "accompanied by the disentangling of the sphere of power, the sphere of law and the sphere of knowledge. Once power ceases to manifest the principle which generates and organizes a social body, once it ceases to condense within it virtues deriving from transcendent reason and justice, law and knowledge assert themselves as separate from and irreducible to power." (Lefort 1988, 17f.)

While for Lefort this disentanglement also drives "a continual reshaping of the processes of acquiring knowledge and (…) an investigation into the foundations of truth" (Lefort 1988, 18), he does not discuss how such an investigation still needs to focus on the *political foundations* of truth as well. Studies on the role of non-epistemic values in science show that a disentanglement of science and politics – and therefore a disentanglement of science and power – is far from the case. The conceptual apparatus developed by Lefort to address the interplay of politics and the political thus needs to be applied to the interplay of politics and science just as well – which leads to asking whether the two blind spots identified in Kuhnian and Lefortian thought might be solved by combining or integrating both accounts.

3.3.3 Comparing Kuhn and Lefort

To see whether Lefortian thought might provide a political complement to the Kuhnian view on science, it is helpful to look in more detail at similarities and dissimilarities between the two accounts. A first similarity is that both Kuhn and Lefort have been read as developing a somewhat Neo-Kantian picture of science and society, respectively (cf. Hoyningen-Huene 1993; Friedmann 2002). For Kuhn, a phenomenal world is co-constituted by the underlying world-in-itself and a paradigm. Kuhnian paradigms thus shape our perception and experience and allow for the distinction between phenomenal world and world-in-itself similar to Kantian categories. However, in contrast

to Kant, they are not of a transcendental but socio-historical nature. Lefort, on the other hand, introduces a distinction between a symbolic and a real dimension of society which together co-constitute an apparently united society from an underlying fractured and divided state. Generative principles provide society's symbolic grounding, shape its real form and can thus similarly be understood as Neo-Kantian elements which provide the conditions for our social life on a socio-historical rather than transcendental basis (cf. Ingram 2006, n. 7). Second, for both Kuhn and Lefort this shaping is manifested in institutional structures in science and society. In Kuhnian *normal science* a specific paradigm and the way of perceiving the world implied by it are manifested in the social and institutional structure of a scientific community. Similarly, Lefort's conceptions of *politics* is the institutionalization of democracy's generative principles. One can thus take *normal science* to be the epistemic equivalent of *politics*, i.e. a societal subsphere representing certain generative principles in the institutionalized real dimension of society. And since *science* is a primarily epistemic endeavor, it represents *epistemic* generative principles.

That any specific such representation, i.e. a normal science, will give rise to anomalies which might eventually lead to its replacement is a crucial part of the Kuhnian view on science and provides a parallel to the Lefortian notion of divergences. For Kuhn, there is no phenomenal world which coincides with the world-in-itself and thus always a divergence between the two of them. This is why anomalies occur, which then drive change of a scientific paradigm and its institutionalization in a corresponding normal science. And for Lefort, there always exists a divergence between the symbolic institution of society and its real manifestation. In the case of society, we might hold 'equality' as one of its generative principles, but such equality cannot be fully instantiated in society, a divergence which at the same time allows for contesting any existing unequal factual order by reference to this generative principle (cf. Weymans 2005; Breckman 2013). In the same way, we might for example hold 'understand the world' as (one of) science's generative epistemic principles without ever having a complete instantiation of that in our science, since we neither have nor know how to produce absolute certainties about the world. All we can do is attempt representations which aim at manifesting these epistemic principles in our real science. But like in the case of the Lefortian divergence between

real and symbolic, there will always be a divergence between these representations and the underlying principle, and this divergence drives paradigm change.

However, as Lefort recognized, the possibility of *politics* is in itself consequence of a specific societal form: It is only established as a unique subsphere of society in the democratic form in which conflict and the recognition of society's groundlessness are institutionalized as politics. Mirroring this approach for the Kuhnian view implies asking whether there is an overall "Kuhnian form" which provides the possibility for the Kuhnian *normal science*. The development of such a Kuhnian form can be approached by drawing another parallel: In parallel to the Lefortian democratic invention, we might state a mutation in science's symbolic order so to speak, with the recognition and acknowledgement of the influence of values in science, or, framed differently, of human agency in shaping research beyond a mere positivist uncovering of the world as it is. Lefort argues that in the course of the democratic invention, the connection of society to its supposedly transcendental grounding was severed. We might similarly argue that in the case of science, the direct connection of science to the world which it supposedly uncovers was impaired. Scientific results and scientific authority could no longer be legitimized by appealing to something which stands entirely outside of science (like the transcendental legitimization of society's unity in the monarchic symbolic order in Lefort's writing). Rather, and similar to the acceptance that the grounds of society are only those that it provides to itself in its own institution, the recognition of the role of values in science implies recognizing the unavoidably social character of science. This does not imply that the connection of science to the world is severed (as Lefort would argue for the case of society and its grounding), since that would amount to a purely constructivist picture of science. I take it that at its core science has an epistemic character and uncovers the world (which is also why I referred to its epistemic generative principles). It rather implies the existence of a plurality of ways of doing science and thus perceiving the world which stems from the fact that it is not possible to simply instantiate or mirror an epistemic generative principle in our real-worldly science, but only to represent it in the Lefortian sense and that attempts of such representations can take different forms.

If this theoretical diagnosis provides the basis for the Kuhnian view on science, his description of the dynamics between *paradigms*, *normal science* and *revolutionary*

science provides a reaction to this diagnosis, similar to the way in which the democratic form in Lefort's writings provides an answer to his diagnosis of the groundlessness of society. Of course, Kuhn framed much of his writings as a descriptive endeavor, but they nevertheless exhibit a certain normative thrust in the sense that he also described the alternating dynamic of normal and revolutionary science as the dynamics in which science *should* proceed – either because there is no other way or because it is the best way of doing science (more on that further down).

However, comparing these two reactions to the democratic invention and its scientific counterpart, it becomes apparent where Kuhnian and Lefortian thought are decidedly *not* parallel, namely in their stance towards pluralism. Kuhn basically stays content with the dynamic between paradigms, normal science, and the continual overhaul of these through scientific revolutions. Rather than taking this view on science as a starting point for discussing how science could evolve in light of his insights, good science for Kuhn basically proceeds as delving into normal science until anomalies occur and are resolved, sometimes within the existing paradigm and sometimes through a revolution. Even though Kuhn stated the existence of a plurality of possible paradigms, he thus remained a scientific monist who insisted on the impossibility of maintaining scientific pluralism as a pluralism of simultaneously existing paradigms. Lefort, on the other hand, developed a rather similar understanding of society as possibly existing in different forms. But even though he acknowledges the need for a single societal form providing the necessary unity to understand a society as *one* (a function similarly fulfilled for scientific communities by Kuhnian paradigms), he then argues for the democratic form which takes up this insight through explicitly recognizing the groundlessness of the social and an institutionalization of conflict about filling that ground. In the democratic form, a synchronous pluralism is thus kept alive as far as possible. The Kuhnian account lacks a similar move, or rather implies that accepting the dynamic of alternating phases of normal science and scientific revolutions is the way in which science should react to its insights. According to Kuhn, only focusing on one paradigm exclusively at a time allows reaching those depths of normal science at which the anomalies necessary to trigger a revolution can occur.

However, this recommendation has political consequences since what is established as scientific facts inevitably influences and possibly constraints other areas of society.

Hannah Arendt has called this the *despotic character* of truth, in the sense that the "modes of thought and communication that deal with truth, if seen from the political perspective, are necessarily domineering; they don't take into account other people's opinions, and taking these into account is the hallmark of all strictly political thinking" (Arendt 1969, 241). Interpreted along the Lefortian view on society this can also be understood as an unresolvable tension between two different generative principles which operate in science and democracy, respectively: 'understand the world' i.e. 'provide determinacy' on the side of science and 'institutionalize indeterminacy' on the side of the political. If science were a purely epistemic matter of understanding the world, such a distinction and a corresponding institutionalization might be possible, similar to the way in which Arendt considers the task of science to be providing factual truths which can then create boundaries for political activities. But given the entanglement of epistemic and non-epistemic issues in scientific research, a Kuhnian strategy of focusing on one paradigm exclusively amounts to a substantial concentration of political power within science. Insofar a paradigm comprises political values, any corresponding normal science will establish those political values within the epistemic resources currently available and thus provide them with an epistemic authority exclusive to science.

Continuing on the Lefortian reaction to the democratic invention would instead imply the development of a science which institutionalizes the underlying pluralism in a way that prevents any lasting occupation of the place of power – a challenging endeavor, because applying the internal logic of a democratic politics to science runs risk of weakening its epistemic authority, while trusting on the internal logic of science too much might lead to a dominancy of its non-epistemic aspects. And as I have argued, this political argument for pluralism in science clashes with the Kuhnian epistemic argument against pluralism in a way that if one commits to the former, the Kuhnian epistemic framework does not provide a satisfying epistemic complement. However, as various philosophers have argued, a pluralist conception of science might not only be politically more appropriate, but also be *epistemically* beneficial (cf. Solomon 2001; Longino 1990; 2002). In the following, I will discuss one such pluralist conception of science, namely Helen Longino's combination of *critical contextual empiricism* and *social value management ideal*.

3.4 A Pluralistic View on Science

3.4.1 The social value management ideal

Helen Longino's account starts from arguing that there is a logical gap between data and scientific theories which is why the latter are always underdetermined by the former. According to Longino, this underdetermination is resolved by background assumptions which „form the framework or proximate intellectual context (…) and (…) structure the domain within which inquiry is pursued" (Longino 2002, 127). Such background assumptions may also contain social values, which therefore unavoidably influence scientific research and give rise to the existence of multiple value-laden perspectives on the same subject area. Longino's diagnosis of scientific research is thus well aligned with the shift in science's symbolic order described earlier and also with the Kuhnian plurality of paradigms and Lefort's understanding of a plural society. However, more in line with Lefort than Kuhn, she then argues for a synchronous institutionalization of such a pluralism within science, i.e. the establishment and maintenance of multiple branches science which accord to different value-laden perspectives. With regard to the specific form of such pluralist scientific regime, i.e. Longino's way of representing epistemic generative principles, she puts focus on assessing the social practices within science which contribute to the generation and evolution of scientific claims and theories. According to her social value management ideal (henceforth SVM), scientific communities are to be structured in a way which allows for critical discursive interaction between scientists with different perspectives with the goal of "transform[ing] the subjective into the objective (…) by assuring that what is ratified as knowledge has survived criticism from multiple points of view" (Longino 2002, 129).

This critical discursive interaction is to be achieved by paying attention to the social structure of scientific communities and implementing four norms which allow for effective critical interactions. There should, first, be public venues for criticism within science which allow for the articulation and dissemination of criticism to the same degree as for any original research. Second, a scientific community should take up criticism, which means that its beliefs and theories should be reactive to any occurring critical discourse and change over time accordingly. Third, there ought to be shared public standards according to which theories, methods etc. are evaluated and criticized and which allow for assessing the relevance of any voiced critique. Lastly, there should be

tempered equality of intellectual authority which is basically a demand that discourse is free of any influence of power relations and thus ensures that "[w]here consensus exists, it [is] the result not just of the exercise of political or economic power, or of the exclusion of dissenting perspectives, but a result of critical dialogue in which all relevant perspectives are represented" (Longino 2002, 131). In structuring the social enterprise of science in such a way that it accords with her four norms, Longino thus aims at institutionalizing scientific pluralism through a scientific community which comprises multiple perspectives but scrutinizes each of them rigorously.

This seems to fit with what happened in the case of IPBES' conceptual framework. Proponents of the ecosystem services and mother earth approach framed human-nature-relationships differently due to different value positions operating in the background. Furthermore, it seems that the Cape Town Workshop provided an avenue for mutual critique of these positions (Longino's first norm) and that uptake of criticism took place when the first draft of the conceptual framework was changed into a dualistic framework (second norm).

3.4.2 Millian roots in the social value management ideal

Longino's account is primarily an epistemic account in the sense that it aims to solve an epistemic problem, namely how a viable concept of scientific objectivity in light of the influence of social values on science can look like. Nevertheless, in its pluralistic conception it also fits with the Lefortian approach of preventing a substantial occupation of the place of power in a society and provides a better complement than the Kuhnian monistic account of science. But how does she deal with the observations made earlier in section 2.2, namely the conflictual interaction during the development of IPBES' conceptual framework and the influence of established particularities? Before discussing these issues, it is helpful to make explicit the connection of Longino's thought to the liberal political philosophy of John Stuart Mill. As Intemann (2011, 112) argues, her account can be understood as an instance of *Millian science*, according to which "ideal scientific communities will be those comprised of participants with diverse values and interests, who have equal authority to advocate for different research directions, theories, models, background assumptions, explanations, and interpretations of data." Longino herself explicitly connects her account to Mill's reasoning on the importance of criticism

and freedom of speech (Longino 2002, 3ff.) and Justin Biddle (2009, 615) even goes as far as claiming that "Longino's epistemology is logically embedded within the framework of Mill's political philosophy."

The most explicit connection between Mill and Longino can be found in the Millian idea of the *marketplace of ideas* which serves as a role model for Longino's account which is also built around the idea of free and open discussion to neutralize individual biases. At its core, such a marketplace assumes an individual who is „hearing what can be said about [a subject] by persons of every variety of opinion, and studying all modes in which it can be looked at by every character of mind" (Mill 2003, 90), establishing an ideal of open-mindedness which has a direct equivalent in Longino's account when she claims that a "practice of genuinely open criticism and discussion requires an openness to all perspectives: no claim or belief can be held immune to criticism" (Longino 2002, 159). Ideal scientific communities thus consist of scientists who are willing and able to not only criticize other perspectives, but also and to the same degree critically reflect upon their own. However, turning back to the development of the IPBES conceptual framework, it appears that interaction there was a lot more conflictual than envisaged by Longino, with people being not as open to critically reflect on their positions as demanded by her account.

Such an observation can be tied back to the Millian roots of Longino's account by considering a critique of Longino's account put forward by Biddle (2009). As he points out, various political philosophers have criticized the Millian account for an underlying assumption according to which individuals can be conceived as 'unencumbered selves' who are able to freely distance themselves from their commitments to certain values or goals. Iris Marion Young puts this in more general terms when she claims that such an 'individualist social ontology' is rather common in liberal political thought and often "goes together with a normative conception of the self as (…) autonomous, unified, free, and self-made, standing apart from history and affiliations, choosing its life plan entirely for itself" (Young 1990, 45). In modeling her account after Millian liberalism, Longino therefore inherits the conception of the individual immanent in it, namely individuals who, upon hearing criticism, are able to distance themselves from their value commitments and easily take up other perspectives. However, as argued by the critics above and seen in the case of IPBES, people are often stronger committed and thus not

willing to put their own perspective into question that easily, leading to conflictual interaction instead of harmonious reflection.

Particularities, on the other hand, present a challenge to Longino's norm of tempered equality, which demands that the assessment of criticism ought to be kept apart from any contextual factors regarding the person voicing the critique. According to Longino, "the persuasive effects of reasoning and argument [should] be secured by unforced assent to the substantive and logical principles used in them, rather than by properties, such as social or economic power, of those who are propounding them" (Longino 2002, 131f.). Particularities, however, make abstracting away from those social factors more difficult, because they are not properties of a person propounding an argument, but rather properties of the different value positions themselves. As such the extent to which value positions are correlated with established particularities directly influences discourse and reasoning (cf. Schönwitz forthcoming). In the case of IPBES, as a matter of fact there are more particular epistemic resources, scientific arrangements, and societal arrangements aligned with the values linked to the ecosystem services approach. And abstracting away from these aspects is not a solution, because (in contrast to the socioeconomic status of the debaters) they are relevant for the ensuing discourse, even though at the same time constituting asymmetries and power differentials within it.

This might go as far that values and particularities are part of the shared standards which determine whether something counts as scientific or not (Longino's third norm). In the case of IPBES, it appears that at first the mother earth approach did not match standards which were implicitly shared within established scientific research. Scientists considered it as too political to be included in the scientific working of IPBES. However, the later inclusion of both ecosystem services and the mother earth approach in a dualistic conceptual framework points towards an evolution of shared standard such that eventually both would be covered by them. This development – from a perception as 'too political' to an acceptance as 'scientifically sound' – can also be found in the statement of a workshop participant reflecting on the overall process:

> "To some degree it was a political solution, because of, say, Bolivia, but actually now I quite like it. I think it talks to some degree to indigenous people (…) and I don't think it sacrifices intellectual rigor at all. So I actually quite like it and to be honest it was an evolutionary process." (quoted in Borie and Hulme 2015, 10)

But this process was not guaranteed to happen, since one could easily imagine cases where existing shared standards are strong enough to prevent such further evolution or not even recognized in their social and changeable character.

Despite its idealization as a power free exchange of ideas, the marketplace of ideas will always be skewed by established particularities as well as power relations arising from those. And more importantly, the underlying political philosophy conceptualizes these phenomena only as contingent limitations on otherwise potentially rational forms of discourse. In doing so, it does not recommendations for treating those limitations as an intrinsic and unavoidable feature of human living (cf. Wenman 2013, 85).

3.4.3 A Lefortian perspective on the social value management ideal

While Longino's account does not offer any assessments or recommendations for dealing with the occurrence of values in science in its political dimension, from its general conception it fits well with any political framework which emphasizes a pluralist and interactive conception of society (such as Millian liberalism). However, the case of IPBES' conceptual framework also shows certain phenomena which find little conceptual space in Longino's account and which might be better understood by adding a Lefortian perspective to Longino's SVM.

Taking up such a perspective implies interpreting Longino's SVM as a (scientific) *form* itself. The realm of mutual critique established by SVM within science can then be seen as an equivalent to the Lefortian realm of *politics*, a structured domain in which a specific type of interaction takes place ("competition between protagonists whose modes of action and programmes explicitly designate them as laying claim to the exercise of public authority" for Lefort (1988, 226f.) and mutual critique of scientific perspectives, theories, and results for Longino). It is structured by SMV's four norms, which take the role of Lefortian generative principles. This allows to distinguish between SVM in its abstract form on the one hand and its actual representation on the other. Any such specific representation will, for example, include those shared standards which for the moment structure SVM's realm of critique and determine its boundaries.

From the Lefortian perspective, democracy is endangered when the realm of *politics* is taken to be all there is while the overall form allowing for the existence of it (i.e. the *political*) is not recognized in its social and contingent character and naturalized instead.

In a similar way, particularity in shared standards can be hidden and corresponding epistemic resources, scientific arrangements or societal arrangements appear opaque with regard to the values upon which they depend. In that case, particularity is concealed, and epistemic resources imply part of the world to *be* a certain way while this is actually just a particular understanding of it, with other conceivable alternatives existing as well. For example, as Ernstson and Sörlin (2013, 276) put it, "[a]n underlying theme of many, if not all, (…) strands of critique [of ecosystem services] is the concern with the (…) assumed non-place position from which a set of standardized methodologies can be constructed and used for deducing 'true' values of ecosystems for any place, or any city, anywhere, at any time." Such a 'non-place position' would then be a position in which the ecosystem services concept appears opaque with regard to all the matters of worldviews or values which shape its form and content. If such an opacity enters Longino's shared standards, the arena for mutual critique provided by SVM looks very similar to a Lefortian realm of *politics* which is not recognized in its own *political* and therefore social and changeable character. This danger is illustrated the Cape Town workshop when one participant argued that "[t]his notion that ecosystem services are the benefits that people get from nature is fairly independent of any ideology" (quoted in Borie and Hulme 2015, 8) while at the same time the mother earth approach was opposed because it was seen as too ideological. The mentioned opacity makes it thus harder for proponents of alternative value outlooks to get through with their position, because they cannot argue within the established realm of mutual critique but have to oppose it from the outside.

In the Lefortian picture, such opposition occurs by pointing out a divergence between a society's underlying generative principles and their actual representation. When applying this to SVM's form, there are two ways in which such a divergence may be pointed out. First, one might consider SVM to be an *epistemic* form, i.e. as aiming at successfully representing epistemic generative principles. A divergence between such principles and their actual representation might then be pointed out by, for example, arguing that established shared standards are in some way epistemically deficient. This was, however, not the route the Bolivian delegation went in their opposition to the ecosystem services approach, since in none of their arguments they claimed that the ecosystem services approach would deliver epistemically deficient results. But second,

and going beyond Longino's original aspiration with SVM, one might consider SVM to be a *political* form as well: Being a sub-sphere of society and possessing a political dimension through the occurrence of non-epistemic values, one could argue that a society's political generative principles should at least partially be represented in science as well, so that (in the case of a democratic society) the kind of political domination described at the end of section 3.3 is prevented. The intervention of the Bolivians during the development of IPBES' conceptual framework can then be understood as an attempt to point out a divergence between SVM's political dimension and democracy's underlying political form. As described, they did not oppose the ecosystem services concept on epistemic grounds, but rather referred to a principle of equality, demanding "equity in the development of approaches to non-commodification of ecosystem services and functions" (UNEP 2012a, 4). In Lefortian terms, they were thus pointing out a divergence between a generative principle of democracy (the principle of equality) and its actual representation in a specific case, namely the establishment of IPBES. And in doing so, they argued from a position which was located outside of established scientific standards and thus rejected by other participants of the CF-process. Their intervention was thus not so much an exchange of arguments and critique within shared standards (i.e. within the "politics" of SVM), but an attempt to disrupt and shift those standards altogether (i.e. a political move of altering SVM's representation).

Looking at this development from the perspective of the proponents of ecosystem services, the mother earth approach was first perceived as politically motivated and therefore epistemically deficient, which indicates an established representation of epistemic generative principles in line with a value-free ideal for science. However, in the end, even participants at the Cape Town workshop acknowledged that the mother earth approach did not 'sacrifice intellectual rigor', as they put it. What happened was therefore not only opposition to SVM's political dimension by the Bolivians who pointed out a political divergence with the underlying principle of equality, but a shift in the representation of SVM's epistemic generative principles in such a way that there was room for the (value-laden) mother earth approach which had previously not been there. Of course, there is no guarantee for such an outcome. One could also imagine a scenario in which the mother earth approach was still not accepted on some other epistemic grounds. In that case, the whole process (and conflict) could have continued, with

opponents of the mother earth approach now pointing out an epistemic divergence. But what the Lefortian perspective makes of this, is to treat it not as an anomaly or something which ideally should not occur, but as normal societal processes.

Adding a political dimension to Longino's account in such a way, even provides a counterargument against an objection which has been put forward against it. Critics argue that SVM's comprehensive pluralism and overall neutrality towards different value positions making up that pluralism, demands the inclusion of value positions related to objectionable positions such as sexism, racism, or Nazism (cf. Hicks 2011; Intemann 2011). But interpreting Longino's SVM as incorporating a political representation of a society's political generative principles, provides a way of dealing with this objection. Simply put, a sexist or racist scientist would not be able to successfully claim that his exclusion from science constitutes a divergence between society's underlying principle of equality and its actual representation in science, because his own position violates that principle.

3.5 Conclusion

In this paper, I have studied the development of the conceptual framework of the *Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services.* During this development a conflict arose between proponents of different approaches to human-nature-relationships, which can be understood as a result of different value positions and corresponding frameworks for conceptualizing the world. Furthermore, it became apparent that those frameworks were not established in equal strength, but rather that the ecosystem services approach – through the existence of according particularities – was in a much more powerful position.

These observations led me to discuss the account of science developed by Thomas Kuhn which also focuses on frameworks (or paradigms, in Kuhnian terms) which structure and guide how scientists conceptualize the world and their research within it. The Kuhnian view on science fits well with the case of IPBES in so far as the different views and firm commitments of proponents of the ecosystem services and the mother earth approach can be interpreted as a consequence of different paradigms in which those actors were rooted. The role and influence of particularities, on the other hand, mirrors the institutional configuration in which paradigms and their corresponding normal science

are manifested. However, the Kuhnian view lacks a distinct political dimension – something which can be provided by work from postfoundational political theory with its focus on the interplay between established structures (i.e. paradigms) and their regular questioning or possibly even overhaul.

A philosophical analysis of such an interplay can be found in the work of Claude Lefort. Lefort argues that there is no naturally given society, but that different *forms* of society can exist. He thereby distinguishes a society's *real* form, namely its factual social order and structure, and its *symbolic* form in the sense of its abstract conditions of existence, also called its *generative principles*. A specific society acquires its factually existing social order in correspondence to its generative principles (for example, many aspects of our modern democratic society correspond to an underlying generative principle of equality). More specifically, the relation between abstract generative principles and established social order is one of *representation*, understood as an "*activity* of making symbolic principles work so that an entire society acquires meaning and legitimacy" (Weymans 2005, 266). That a specific society acquires and maintains its real form is thus due to an ongoing representation of its symbolic form to itself. Power can then be understood as situated as well as instituting and maintaining a society's form as part of that ongoing representation. But in that process, power differentials within the representation of a society's form might also be established which can affect different people to different extent. Crucial characteristic of the democratic form is then that it both recognizes the role power plays in instituting society and the contingent nature of that very process. Consequently, it attempts to institute the recognition of the place of power being empty and only temporarily occupied at the center of its form.

Kuhn's and Lefort's views on science and society have substantial similarities. However, they differ in their respective views on monism and pluralism in science and society. Kuhn emphasizes that science is and ought to be a monist enterprise in which only one paradigm is established at a time. For Lefort, on the other hand, fostering pluralism as an institutionalization of the fundamental indeterminacy of democracy and thereby preventing lasting domination within society is of paramount importance. But such lasting domination can also be exerted by science through the occurrence of non-epistemic values within it. This provides a political argument against the Kuhnian monist

account of scientific research and implies a similar institutionalization of pluralism and indeterminacy within science as it is advocated by Lefort for the case of society in general.

I have thus turned to more plural accounts of scientific research and discussed Helen Longino's combination of critical contextual empiricism and social value management ideal. While it is plausible to interpret the case of IPBES in terms of Longino's account, it is challenged when trying to make sense of the rather conflictual interaction between proponents of the ecosystem services and mother earth approach as well as the influence of established particularities. These problems can be traced to Longino's reliance on the political liberalism of John Stuart Mill. The conception of the individual implicit in Mill's liberalism takes individuals to be able to distance themselves easily from their own values and perspectives and can therefore only with difficulties address the conflictual interaction stemming from hardened commitment to their positions by different actors in the IPBES case. Furthermore, Millian liberalism envisages a power-free exchange of ideas and arguments as an ideal state which we ought to manifest in our social and political life. The notion of particularities shows, however, that such a free marketplace of ideas is not only impossible for contingent empirical but more fundamental reasons. Instead of trying to approximate the ideal state of power-free exchange, it is thus more fruitful to incorporate the existence and influence of particularities and resulting power differentials as unavoidable features of human life already on the conceptual level.

However, these issues can be addressed by enriching Longino's social value management ideal by some of the insights gained by the earlier discussion of Lefort's view on society. This implies interpreting SVM as a *form* itself for which its four norms act as (epistemic) generative principles. The Bolivian opposition can then be understood in a twofold way. On the one hand, they appealed to a divergence between the factual political dimension of SVM and democracy's generative form, more specifically democracy's generative principle of equality. On the other hand, their intervention shifted the representation of science's epistemic generative principles in such a way that there was room for concepts which were previously seen as too political. This interpretation attempts to make sense of the observation that the conflict between proponents of the ecosystem services and mother earth approaches did not take place within the standards established in science, but rather changed them such that at the end of the process the

understanding of what would be included in the conceptual framework and IPBES' work and thus count as *scientific* had changed.

Chapter 4

Pluralism and Pluralization at IPBES

4.1 Introduction

The establishment of the *Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES)* was accompanied by a strong dissensus about its conceptual approach to nature. At first, IPBES was to be based on the concept of *ecosystem services*, a concept which had been at the center of biodiversity research since the early 1990s. However, critics, led by the Plurinational State of Bolivia, argued that this framework contributed to an instrumental understanding of nature, thereby furthering its commodification. The controversy found a climax when at IPBES' second plenary meeting the Bolivian delegation demanded "equity in the development of approaches to non-commoditization of ecosystem services and functions" (UNEP 2012a, 4) and declined to join the organization when despite their opposition a clear focus was put on ecosystem services. Six years later, IPBES adopted a new conceptual framework out of the "need to be inclusive, both in terms of the strands of knowledge incorporated and representation of worldviews, interests and values" and endorsed an approach which (allegedly) "has the potential to firmly embed and welcome a wider set of viewpoints and stakeholders" (Díaz et al. 2018a, 271). In this paper, I will study this development and argue that the case of IPBES, ecosystem services and mother earth is a case of evolving pluralism within science and scientific research and as such it is a case of *pluralization* within science. I will further assess whether a discussion of such a scientific pluralization might benefit from work in political theory which deals with the same issue on a broader societal level.

To explore this question I will first study the case of IPBES and the ways in which a pluralization of its conceptual approach to nature took place over the course of its existence (section 2). In section 3.1, I turn to political theory and argue that connecting philosophy of science to agonistic theories of democracy can be fruitful for assessing scientific pluralization. I will discuss in more detail the work of two thinkers associated to this school of thought that I consider to be especially helpful: William Connolly's account of *responsive agonism* and Jacques Rancière's *oppositional agonism*. I will furthermore argue, that as a parallel to Rancière's notion of a *distribution of the sensible*

the notion of a *distribution of scientific resources* can provide a tentative link between political and scientific conceptions of pluralism and that this enables importing aspects of Rancière's and Connolly's accounts into a discussion of scientific pluralism. In section 3.2, I assess the development of IPBES in such terms and draw some general consequences for pluralism and pluralization in science in section 3.3.

4.2 The Evolution of Pluralism at IPBES

4.2.1 The 'ecosystem services' concept

Crucial for the development of IPBES was the concept of *ecosystem services*. It designates those processes within ecological systems which serve human well-being and have often been referred to as "the benefits people obtain from ecosystems" (Millennium Ecosystem Assessment 2005a, v). These benefits are often valued in monetary terms. For example, a wetland can provide the ecosystem service of buffering surrounding areas from flooding by soaking up rain and thereby prevents the costs of otherwise occurring flood damage. Originating in the 1970s, the concept has seen a steady rise in prominence and importance within the field of biodiversity research starting in the 1990s with a first climax when it was adopted as a core concept for influential reports such as the Millennium Ecosystem Assessment in 2005. After that, the concept became even more widespread within the field of sustainability research.

But throughout its existence the ecosystem services concept has also been criticized, mostly for two reasons: First, critics have argued that it both presumes and enhances an understanding of humans and nature as two distinct and separate realms in which nature conceptualized as having an instrumental relation to humans only (cf. Turnhout et al. 2013; Schröter et al. 2014; Barnaud and Antona 2014; Kull, de Sartre, and Castro-Larrañaga 2015). It is argued that this tendency is already visible on the terminological level when ecosystem services are characterized as the "benefits people obtain from ecosystems" and that it stands in contrast to other, more holistic conceptions. These would emphasize the mutual intertwinement of humans and nature, examples of which can be found in many cultures of the Global South (cf. Sullivan 2009). Second, the focus on the *value* of ecosystem services has been criticized as furthering commodification of nature and might even be detrimental to conservation efforts as it imports a capitalist logic of growth and exploitation (cf. McCauley 2006; Kosoy and Corbera 2010; Gómez-

Baggethun et al. 2010; Gómez-Baggethun and Ruiz-Pérez 2011; Dempsey and Robertson 2012; Robertson 2012). This critique applies in particular to valuing ecosystem services in monetary terms which, even though not an intrinsic feature of the ecosystem services concept, in practice is the dominant approach in research on ecosystem services (cf. Chan and Satterfield 2020).

4.2.2 Phase I: Establishing IPBES

First proposals for establishing an IPCC-like organization for biodiversity research were made in 2005 by France's then president Jacques Chirac (cf. Bai et al. 2005, 3). From that point, the process took about seven years and a series of workshops and meetings until IPBES was officially established in 2012 (cf. Vadrot 2014b). During IPBES' early development phase there was an explicit aim that, in contrast to the IPCC, it should include not only resources from established science into its workings but also indigenous and local knowledge and the respective knowledge-holders (cf. Vadrot 2014a). And yet, because ecosystem services were such a central concept in biodiversity research at the time, they were included from the start in the set up of the organization (see for example Loreau et al. 2006; Larigauderie and Mooney 2010). This tendency continued over the course of its establishment and ecosystem services became more and more firmly enshrined as IPBES' core concept (cf. UNEP 2008; 2009; 2010; 2011; 2012a).

This focus only became an explicit point of contention at a rather late stage in the process, namely when the delegation of the Plurinational state of Bolivia argued against the ecosystem services approach at the plenary meeting in 2011. They stated that the concept "did not reflect adequately their vision of the relationship between human beings and nature" (UNEP 2011, 5), fearing that, because of its economic framing, making it central to the working of IPBES would implicitly promote a predominantly western logic of economic growth. Similarly, at the second plenary session in 2012, they claimed that there should be "equity in the development of approaches to non-commodification of ecosystem services and functions" (UNEP 2012a, 4), effectively demanding a pluralization within IPBES' approach to humans and nature. The intervention of the Bolivian delegates was unsuccessful. The plenary settled on establishing IPBES with

clear a focus on ecosystem services and consequently several states such as Egypt and Bolivia did not join.

4.2.3 Phase II: Developing a conceptual framework

After it had been established, IPBES proceeded to develop the conceptual framework which would guide and structure its scientific work. Even though a first draft for a conceptual framework was developed rather quickly (cf. UNEP 2012b), it met strong opposition by several of IPBES' member states, including most vocally the Plurinational State of Bolivia which had joined IPBES in the meantime (cf. Plurinational State of Bolivia 2013). They argued against the conceptual framework in a twofold way. On the one hand, they claimed that the focus on ecosystem services would implicitly endorse a position according to which "human beings are entitled to manage and to exploit nature in an anthropocentric view of development, so that nature and ecosystems must contribute to the achievement of the individuals' well-being" (Plurinational State of Bolivia 2013, 2). While this argument was directed at the specific content of the conceptual framework based on the ecosystem services approach, another line of reasoning emphasized the lack of diversity within the proposed framework, since, according to them, it "only represents the views, visions and approaches of the Western modern society and it is completely biased towards a particular vision of biodiversity" (Plurinational State of Bolivia 2013, 2). As an alternative, they put forward their own proposal for a conceptual framework which was centered around the South American concept of *mother earth* and a holistic and intertwined view on humans and nature (cf. Plurinational State of Bolivia 2013).

Consequently, a workshop in was held in Cape Town in 2013 to reconcile these divergent positions and settle on a conceptual framework for IPBES to use. At the workshop, it became clear that both sides opposed the other's approach, because they considered it too political (cf. Borie and Hulme 2015). However, because within IPBES decisions are usually reached by consensus, the Bolivian delegation effectively possessed the power to block any further development with which they disagreed. This prevented them from being simply overruled as was the case during the earlier establishment of IPBES. The stalemate was thus only broken when both sides settled on an "agree to disagree"-solution and put forward a dualistic framework which entailed both concepts from Western science such as ecosystem services and ones from other knowledge

systems such as mother earth (Díaz, Demissew, Joly, et al. 2015; Díaz, Demissew, Carabias, Joly, Lonsdale, Zlatanova, et al. 2015). Effectively, the dissensus was thus resolved by a pluralizing move which created space for the mother earth approach within the scientific framing of IPBES. And even though it was born out of dissensus and controversy, once established the dualistic conceptual framework was hailed as a 'Rosetta Stone for Nature's Benefits to People' in the sense that it (supposedly) "highlights the commonalities between very diverse value sets and seeks to facilitate crossdisciplinary and crosscultural understanding" (Díaz, Demissew, Joly, et al. 2015, 4). This emphasis on translatability has, however, been criticized as downplaying the original dissensus (Dunkley et al. 2018).

4.2.4 Phase III: Adopting the 'nature's contributions to people' concept

In 2018, a modified conceptual framework for IPBES was presented. Its main modification consisted in the introduction of the new concept of *nature's contributions to people (NCP*) (Díaz et al. 2018a; see also IPBES 2017). Nature's contributions to people, according to this framework, "are all the contributions of nature, both positive and negative, to the quality of life of humans as individuals, societies or humanity as a whole" (IPBES 2019, 14). It was supposed to create a space within which all different conceptualizations of human-nature-relationships could find place and furthermore weaken the dominance of economic framings of such relationships that had pervaded ecosystem services research and practice so far. As the authors stated:

> "The need to be inclusive, both in terms of the strands of knowledge incorporated and representation of worldviews, interests and values (…), required IPBES to move to using NCP. Although still rooted in the MA ecosystem services framework (…), this new approach has the potential to firmly embed and welcome a wider set of viewpoints and stakeholders. It should also be less likely to be subsumed within a narrow economic (such as market-based) approach as the mediating factor between people and nature." (Díaz et al. 2018a, 271)

Corresponding to such a wider set of viewpoints, two perspectives on NCP were proposed – mirroring in a way the earlier distinction between academic and indigenous concepts. On the one hand, there is a so-called *generalizing perspective*, considered to be "fundamentally analytical in purpose" and, on the other hand, a *context-specific*

perspective considered to be "typical, but not exclusive, of local and indigenous knowledge systems" in which "the production of knowledge typically does not explicitly seek to extend or validate itself beyond specific geographical and cultural contexts" (Díaz et al. 2018a, 272). Within both perspectives, NCPs are the primary categories which are to be identified and studied. But while in the generalized perspective "a universally applicable set of categories of flows from nature to people" (Díaz et al. 2018a, 271) is sought, no such classification schema is available (nor considered possible) for the context-specific-perspective. Instead, within the context-specific perspective NCPs might be presented "as bundles that follow from distinct social-cultural practices, language and lexicon, and ethnoecological knowledge associated with forms of interaction with the environment" (IPBES 2019, 17).

The NCP approach thus attempts at the same time to unify the conceptual framework and broaden its scope. It (supposedly) unifies it by establishing NCP as a core concept throughout the whole framework, replacing the earlier division between ecosystem services and the mother earth approach. And it (supposedly) broadens it, because the NCP approach is intended to expand IPBES beyond a predominantly economic framing of biodiversity while the context-specific perspective allows for an easier inclusion of other knowledge systems. Further emphasizing this attempt at unification, the authors explicitly distanced themselves from the conflictual way in which the conceptual framework was reached at the Cape Town workshop by pointing out that "NCP was adopted to make our collective understanding of the links between nature and people's quality of life broader and richer, and not as a political compromise" (Díaz et al. 2018b). While the new conceptual framework has been employed for IPBES' *Global Assessment Report* in 2019, the extent to which this inclusion of more perspectives will work out in practice is still an open question. However, it has already been concluded in several analyses that the new framework goes conceptually beyond existing research within the ecosystem services approach and thus amounts to a substantial evolution of the old framework (cf. Kadykalo et al. 2019; Hill et al. 2021).

4.3 Pluralism and Pluralization

4.3.1 Pluralism in science and society

The case of IPBES is an example of scientific pluralism being established to varying extent in the different phases just described. Such scientific pluralism has been extensively discussed by philosophers of science, for example with regard to the ways in which pluralism can or ought to be structured or concerning its potential epistemic or normative benefits. But what happened at IPBES can also be understood in terms of a process, namely a process of *pluralization* in science. The importance of considering such processes and studying how to *attain* pluralism in science (complementing the question of how to *maintain* it) has also been emphasized by some philosophers of science. Helen Longino, for example, argues that "a community (…) must do more than be open to the expression of multiple points of view; it must also take active steps to ensure that alternative points of view are developed enough to be a source of criticism and new perspectives. Not only must potentially dissenting voices not be discounted; they must be cultivated" (Longino 2002, 132). And Hasok Chang has developed an account of *active normative epistemic pluralism* where the qualification as *active* refers to its goal of "actually cultivating multiple systems" of practice in a given area of science (Chang 2012, 269). However, Longino does not elaborate much on how exactly dissenting voices ought to be cultivated and Chang mostly develops recommendations for philosophers and historians of science on how to foster pluralism.

When studying the developments at IPBES with a focus on the specific ways in which pluralization took place, I consider a combination of considerations from philosophy of science and political theory to be especially fruitful. This is because pluralization is always occurring against the background of a status quo. As such, it always has a dimension of disturbing and shifting what is already there. This dimension has also been in the focus of so-called agonistic theories of democracy which pay special attention to the important role of conflict within democracy. Such theories

> "emphasize conflict and dissension as themselves constitutive of democracy, as necessary to maintain its openness. On this view, the main danger to democracy would be freezing or institutionalizing a particular arrangement of power. Politics-as-conflict is always necessary to renew politics-as-regime by challenging its limits." (Ingram 2006, 38)

Within agonistic thought, I consider the emphases on different aspects of pluralization found in the work of William Connolly and Jacques Rancière to be very helpful for interpreting what happened at IPBES.

A central theme in William Connolly's work is what he calls the tension between pluralism and pluralization (cf. Connolly 1995; 2005). As he argues, social pluralism is often celebrated as an achievement while movements for further pluralization are implicitly considered to put this achievement in danger (Connolly 1995, xiv). Thereby, the diversity achieved through past conflicts and collective actions might be frozen, preventing the emergence and establishment of new identities (Connolly 1995, xiiiff.). It is thus important to assess those larger contexts within which plurality and diversity are located and the extent to which they allow or hinder further pluralization, something Connolly has called the *politics of becoming* (cf. Connolly 2005, 121ff.). He takes two *civic virtues* to be conducive of his politics of becoming, a virtue of *agonistic respect* and a virtue of *critical responsiveness*. While agonistic respect is a relation between groups who are already recognized and established on the societal landscape of diversity, critical responsiveness is relevant for processes of pluralization which are still under way. In other words, agonistic respect refers to *being*, while critical responsiveness is relevant for *becoming*.

Agonistic respect describes a relation between opponents who are in positions of roughly equal power. They stand in a relation to each other in which they "may test, challenge, and contest pertinent elements in the fundaments of the others", but "each also appreciates the comparative contestability of its own fundaments to others, drawing upon this bicameralism of citizenship to inform their negotiations" (Connolly 2005, 123). Critical responsiveness, on the other hand, is directed at others who challenge an established order from weaker positions with the goal of allowing new identities to emerge without being suppressed by what is already established. It "takes the form of *careful listening and presumptive generosity* to constituencies struggling to move from an obscure or degraded subsistence below the field of recognition, justice, obligation, rights, or legitimacy to a place on one or more of those registers" (Connolly 2005, 126). Crucially, this concerns how one deals with whatever standards of judgement are established at a given time, since in the context of the politics of becoming some of those established standards might be part of the problem that prevents new identities from

emerging. Critical responsiveness comprises a willingness to move beyond and possibly recompose what has been established so far. Enabling further pluralization thus depends, firstly, on people engaging each other in accordance with the virtues of agonistic respect and critical responsiveness and, secondly, on the extent to which those virtues are spread throughout society and societal institutions.

Another political theorist concerned with the possible freezing of a societal status quo is Jacques Rancière. He addresses this issue by introducing a distinction between an established social order, a "set of procedures whereby aggregation and consent of collectivities is achieved, the organization of powers, the distribution of places and roles, and the systems for legitimizing this distribution" (Rancière 1999, 28) on the one hand, and the reconfiguration of such an order through "a series of actions that reconfigure the space where parties, parts, or lack of parts have been defined" (Rancière 1999, 29f.). Rancière reserves the term *politics* for the latter, *the police* for the former (acknowledging that this choice of term does pose some problems – I will not venture into this terminological territory here). Rancière's notion of *politics* is similar to Connolly's concept of *pluralization* since both focus on the process of changing an established status quo and the corresponding preconditions for such processes. For Rancière, an established order is crucially connected to what he calls a specific "distribution of the sensible" (*partage du sensible*). Such a distribution is "the system of self-evident facts of sense perception that simultaneously discloses the existence of something in common and the delimitations that define the respective parts and positions within it" (Rancière 2004, 12). It can be compared to a Kantian historical a priori which determines what is presented to human experiencing, providing "the most basic system of categorization through which we perceive and intuitively classify the data provided to our senses" (Citton 2009, 120).

By creating a shared space of what is deemed sensible, such a distribution thus provides the preconditions for a political community and at the same time creates a fault line between those that can take part in the shared sensible and those that cannot, i.e. those that are deemed insensible by a given distribution. It is exactly at this fault line, where politics (in Rancière's sense) occurs, since, as Panagia (2010, 97) puts it, the "division between the sensible and the insensible is the locus of political struggle that is made manifest when those groups, individuals or collectivities whose modes of perception are deemed illegitimate (i.e. insensible) by a governing partition of the sensible demand to be

taken into account". This hints at what Rancière considers as the primary mode of democratic politics. In contrast to Connolly's emphasis on agonistic respect and critical responsiveness as key virtues of democracy, Rancière considers opposition and contestation as the primary means for changing an established order. Both Rancière and Connolly thus focus on the boundary between an existing plurality and that what is not currently established within that plurality, albeit with a focus on different actors: While critical responsiveness is primarily a virtue of those within an established social order towards marginalized and emerging groups, Rancière's focus on opposition puts those marginalized groups and their attempts to reconfigure a given distribution of the sensible in the center. For him, conflict ensues due to the excluded resisting their exclusion. Politics, in Rancière's sense, is not just any resistance against an established institutional order but has an emancipatory character. It is connected to the perspective of the excluded who are struggling to be included and thereby gain, what he calls, the "share of the shareless". Due to their different emphases, the accounts of Rancière and Connolly have also been labelled *oppositional agonism* and *responsive agonism*, respectively (cf. Wingenbach 2011).

With his idea of the distribution of the sensible and the aesthetic dimension of politics, Rancière provides a way to connect his discussion of politics and society to considerations of science and research. In doing so, I do not intend to import the perceptual dimension in Rancière's account to science in a literal sense nor do I wish to argue that scientific knowledge influences how we literally perceive the world and what is sensible for us. Rather, and analogous to Rancière's notion of the distribution of the sensible, by attempting to gain knowledge about the world science provides people with a *distribution of scientific resources*. Such a distribution influences how humans think about and conceptualize the world. A distribution of scientific resources fixates a specific conceptual order as predominant conceptualization and understanding within a certain society. In the case of IPBES, for example, the established distribution of scientific resources was framed by the concept of ecosystem services which emphasized an instrumental understanding of nature and its economic valuation. Such an order was excluding or marginalizing for people whose understandings and experiences of the world are not captured by the corresponding distribution such as the Bolivians. The fixity of such a conceptual order and the extent to which it prevents further pluralization can thus

be related to both Rancière's notion of *the police* and Connolly's worry of a frozen societal status quo. It thus allows applying their theories of oppositional and responsive agonism to science and scientific pluralism.

4.3.2 Oppositional and responsive pluralism at IPBES

As discussed in section 2, IPBES' conceptual approach to the interrelations between nature and humans evolved substantially throughout its history. The dispute took its explicit beginning when the Bolivian delegation contested IPBES' focus on ecosystem services at the first plenary meeting in 2011. They argued that their own perspective on the human-nature-relationship which was common in many countries of the Global South was not captured by the dominant "view on nature" in science, including IPBES. Their interventions during the processes of establishing IPBES and developing its conceptual framework thus constituted an attempt to reconfigure an established distribution of scientific resources and its accompanying order.

These processes of (attempted) pluralization played out quite differently during the three stages of IPBES' development discussed in the previous sections. During the first phase, there was an initial willingness to include marginalized (i.e. non-academic) voices and perspectives in IPBES. However, eventually the established distribution of scientific resources which was more in line with the ecosystem services approach prevailed and the establishment of IPBES occurred without any pluralization and a sole focus on ecosystem services. While the beginning of IPBES' establishment can hence be seen as showing some critical responsiveness towards indigenous positions (in Connolly's terms), later attempts to reconfigure the distribution of the sensible that tried to render alternative approaches to human-nature-relationships visible were unsuccessful.

In the second phase, we see a process of actual pluralization, since over its course, IPBES' conceptual framework evolved from a draft containing a single focus on ecosystem services into a dualistic framework in which both, proponents of the ecosystem services approach and proponents of the mother earth approach, found a place. This process was, however, not so much characterized by critical responsiveness or agonistic respect, but rather by an oppositional stance between different groups, with the Bolivians in the role of a marginalized group trying to reconfigure an established distribution of the sensible. The eventual pluralization was not resulting from an explicit intention to include

multiple and diverse approaches and worldviews into IPBES' workings, but rather a political compromise due to a "very powerful set of interventions from the Bolivians that really re-framed it", as a participant of the Cape Town workshop put it (quoted in Borie and Pesche 2017, 148).

Lastly, pluralization in the third phase of IPBES is an ambivalent matter. On the one hand, the adoption of NCP as a core concept for IPBES was intended to broaden IPBES' scope and allow for an easier inclusion of multiple viewpoints. It induced a shift away from predominantly economic assessments of ecosystem services and thereby took up the Bolivian critique and acknowledged the contestability of the established ecosystem services approach. In line with Connolly's demand that the "civic virtues of pluralism (…) must become embedded in numerous institutional practices for a positive ethos of pluralism to be" (Connolly 2005, 65), the new conceptual framework can be understood as an institutionalization of those virtues within IPBES' practices. It aims to establish a general openness for people outside of the established conceptual order by offering them an anchor point to. As Berta Martín-López, one of the lead authors of IPBES' Regional Evaluation Report for Europe and Central Asia, states:

> "What it represents is that we have much more flexibility and thanks to recognizing the two approaches, the generalizing and the context-specific, marginalized communities that are directly affected by the deterioration of nature may be able to have a voice in the decision-making process." (Martín-López 2018)

Ideally, the NCP framework would therefore be able to incorporate a variety of non-mainstream approaches, rather than taking up one particular 'other' approach (i.e. the mother earth approach in the previous conceptual framework).

But on the other hand, there is an implicit tension within the statements made by the authors of the new framework. They clearly recognize

> "that there are no uniform needs (beyond those involved in physical survival), aspirations, perceptions, or preferences towards nature and NCP across the whole humankind, but rather a highly uneven, complex, constantly evolving mosaic of views, interests and stakes across and within societies" (IPBES 2019, 12f.),

acknowledge

> "that culture is the lens through which all the elements of nature are perceived and valued" (IPBES 2019, 16),

and even that

> any "concept that links human societies with decisions, be it NCP or ES, is in a broad sense political" (Díaz et al. 2018b).

Making these commitments does not fit well with the claim that both the generalized perspective and the 18 categories of NCPs are considered "fundamentally analytical in purpose" and seeking "a universally applicable set of categories of flows from nature to people" (IPBES 2019, 16). It thereby seems that on a general level IPBES accepts the value-ladenness of science and scientific concepts but due the way context-specific and generalized perspectives are introduced it assumes that only in the context-specific perspective influences of values as well as a non-neutrality of NCPs can be found. The generalized perspective, on the other hand, is considered value-free – or at least value-free enough that an explicit discussion of values influencing its NCPs is not deemed necessary. When combined, the new conceptual framework therefore both opens up a space for further pluralization and establishes a new fault line where future conflicts about the limits of such pluralization might arise.

4.3.3 Pluralizing pluralism

IPBES has often emphasized the pluralism that has been achieved (a "Rosetta stone" in the second phase or "bigger tent" in the third one), but these achievements would have been impossible without the processes leading up to that pluralism. In addition to asking "what conditions permit the maintenance of plurality" (Longino 2002, 212) often asked in philosophy of science, we should thus, firstly, also study the conditions which permit further pluralization of a given plurality. Secondly, we should not consider any achieved pluralistic state to be ideal and universally satisfying, as that would already be the first step in freezing that very configuration and preventing further pluralization.

The case of IPBES furthermore shows that different kinds of pluralization can be fruitful at different times since some of its aspects can be better interpreted by Rancière's account and others by Connolly's. Such an approach has the advantage of not having to conceptualize any actually occurring events as anomalies within its theoretical

understanding. From the perspective of Connolly's responsive pluralism, the second phase in IPBES' development would be seen as regrettably conflictual and it would be emphasized that people would have needed to listen to each other more carefully as well as respect each other's position more firmly. On the other hand, while an oppositional view on pluralism such as Rancière's can make sense of the second IPBES phase, it does not have much to say on the ways in which a new distribution of scientific resources was constructed during the third phase, nor on how critical responsiveness was established in the current NCP framework. But this oppositional approach might become more applicable again in case a future conflict arises about the new fault line between generalized and context-specific perspective within that framework. Having a broader set of accounts of scientific pluralization can thus be helpful for meaningfully studying different phases of actually occurring pluralization in science.

But this begs the question, if there are any criteria to distinguish cases of epistemically justified scientific pluralization from distortions of epistemic integrity by social or political values. The case of climate change deniers comes to mind who demand to have their perspective included in science by appealing to critical responsiveness or pluralization in general. It is important to note therefore that both Rancière and Connolly are not arguing that any call for pluralization should be immediately conceded to. Rather, pluralization for Rancière has an emancipatory thrust only when it comes from a marginalized perspective within an established distribution of the sensible. His account is based on a principle of equality and provides normative justification for pluralization only in cases of the *shareless demanding their share*. Whether an attempt at pluralization is of such an emancipatory character will often itself be part of the struggle and is essentially an empirical question. It is therefore tied to the specific situation in which a specific attempt of pluralization is occurring and needs to be analyzed on that case-specific level. In possible response to climate change deniers demanding pluralization, for instance, one could argue from this perspective that their demands are rooted in an basic economic interest to maintain the status quo of a capitalist society oriented towards economic growth and exploitation of the natural world (cf. Jacques, Dunlap, and Freeman 2008; Oreskes and Conway 2010; Klein 2015). Following up on that analysis, on could thus argue that an attempt to pluralize science along the views of such climate change deniers lacks the kind of marginalization crucial to Rancière's account.

Connolly is less explicit in providing grounds to deny demands for pluralization. But he makes clear that

> "[c]ritical responsiveness is *critical* in that it does not always accede to everything that a new constituency or movement demands. But the catch is this: The criticism is not securely guided by established codes or criteria of interpretive judgment. For some of them turn out to be part of the problem. This is the crucial moment to tap an open reserve of receptivity not entirely captured by the ethico-political criteria of judgment heretofore absorbed. For when selective elements in the existing context of judgment are thrown into doubt by an unexpected turn in time, suppleness is needed. Cultivation of creativity, close attunement to new circumstances, preliminary receptivity to negotiation, and a readiness to explore how some element in received standards might be in need of selective recomposition–these are subvirtues simmering within the practice of critical responsiveness." (Connolly 2005, 127)

While it is possible to resist calls for pluralization, there are no general criteria for doing so, because any analysis of a specific case might require a partial modification of such criteria. This also underlines the case-specificity of assessing any actual pluralization.

Of course, both Rancière and Connolly did develop their accounts for the case of societal pluralization and therefore only consider a societal dimension. Science, however, comprises an additional epistemic dimension. Of course, the philosophical debate on what constitutes epistemic integrity and to what extent social values can influence science without compromising it is far from concluded. But extensive work has been done in this area which can be useful when it comes to assessing cases of (attempted) pluralization. Theoretical resources are therefore available with regards to both, the political and the epistemic dimension, but undertaking such analysis will always involve substantial empirical work to uncover the particular context of any specific pluralization.

This is of importance also for philosophers of science when they study cases of pluralization. As I see it, it is only afterwards, as in the case of IPBES right now, that one can assess the initial situation as well as the process of pluralization that did occur and the new situation reached through that process. Attempting such an assessment while this pluralization is still *under way* will always depend on making predictions about what kind of situation might emerge once it is resolved. No assessment of how it will have played

out is possible while the process of pluralization is unresolved and, as Connolly argues, some of the standards or criteria employed while thinking about how it should be resolved might change in the course of that very process. As a participant at IPBES' Cape Town workshop (who was of course situated very much within that struggle) commented afterwards:

> "To some degree it was a political solution, because of, say, Bolivia, but actually now I quite like it. (…) I don't think it sacrifices intellectual rigor at all. So I actually quite like it and to be honest it was an evolutionary process" (quoted in Borie and Hulme 2015, 10).

When engaging with such a debate while it is still under way, one is thus always located *within* the struggle over determining whether the specific pluralization in question is going to take place or not and taking a position *within* that struggle (for an insightful paper on this kind of situatedness, see Rouse 1996). That need not be a problem and does not change what kind of arguments one can put forward at all. But it is important to recognize that debates about the general dynamics of pluralization in science and debates about scientific pluralization in an actual, specific case take place on such different levels and that one will take up roles of a different character in such debates.

To conclude this section, let me relate these discussion back to recent philosophical accounts of pluralism in science. Many thinkers put an emphasis on responsiveness and mutual understanding much in line with the responsive approach to pluralism developed by Connolly. This also fits with what is usually considered to be an overall scientific attitude, namely self-reflecting critical thinking as well as a corresponding openness for criticism. Helen Longino's social value management ideal, for instance, aims to structure a pluralist science in such a way that scientists interact with each other openly and self-reflectively (Longino 2002, 128ff.). Hasok Chang, similarly, argues for *active normative epistemic pluralism* and discusses the *benefits of toleration* and *benefits of interaction* between different systems of scientific practice within such a pluralist science (Chang 2012, 268ff.). Philip Kitcher's well-order science is modeled upon a Rawlsian conception of deliberative democracy and centered around affective conditions of *mutual engagement* (cf. Kitcher 2011, 51f.). All of these accounts focus on rather harmonious interaction between different groups within a pluralist regime.

There is a lot of value to such approaches to scientific pluralism. However, since I argued that the first and second phase of IPBES' development did not really fit with such an approach and might better be put in terms of Rancière's oppositional pluralism, an oppositional dimension can also be a valuable addition to accounts of scientific pluralism in philosophy of science. Such a dimension is more apparent in the work of philosophers who emphasized the role of scientific collectives such as Ludwik Fleck (1979), Thomas Kuhn (1996), or Imre Lakatos (1970) as well as in Ian Hacking's (1982; 2012) notion of *styles of reasoning*. However, recent philosophical work on scientific pluralism, the intertwinement of science and society, or values in science has not often connected to these lines of thought (cf. Biddle 2009).

4.4 Conclusion

In this paper, I have studied the development of IPBES and hopefully shown that if one is concerned with pluralism, it is also important to assess the processes of pluralization allowing any such pluralist state to come into being. As far as non-epistemic values are involved, such processes can furthermore be understood as comprising a political dimension and a focus on pluralization has consequences for to the kind of political theory which can fruitfully be employed to analyze that dimension. Processes of pluralization disrupt and change an established status quo, and, correspondingly, agonistic theories of democracy with their emphasis on conflict and contestation can provide valuable insights. Of course, different strands of political thought can be helpful for different goals. Approaches which are for example rooted more firmly in political liberalism or deliberative theories of democracy can be helpful for developing conceptions of scientific pluralism as a state (see for example Longino 2002; Kitcher 2011). Agonistic theories of democracy, on the other hand, could help in theorizing scientific pluralization and thereby play a similar role in philosophy of science as they do within the overall field of democratic theories, where it that has been described by Martin Nonhoff as one

> "that stands in contrast to liberal, republican or deliberative theories which are stronger when it comes to institutions. [Agonistic theories of democracy] are stronger in theorizing the non-institutional, and sometimes anti-institutional, side of

> politics. Of this, there is also great need, since institutionalized power is usually more effectual than non-institutional power, and challenging it will need thorough theorization" (Nonhoff 2012, 480).

Within agonistic thought, I have discussed the accounts of William Connolly and Jacques Rancière. Both emphasize the importance of preventing an established status quo from becoming frozen and unchangeable because that would prevent any marginalized social groups from emerging. In responding to that possibility, Connolly develops a civic virtue of agonistic respect and one of critical responsiveness, which are supposed to provide conditions allowing such groups to emerge and become established on the societal landscape. Rancière on the other hand, focuses on oppositional interventions of the marginalized for changing that societal landscape. Thus, agency is focused differently in Connolly's responsive and Rancière's oppositional agonism. Oppositional agonism centers on the people working towards change, while responsive agonism focuses on the responsiveness of those people who are already well situated within an established status quo. This "status quo" is theorized by Rancière through his notion of a *distribution of the sensible*, which constitutes the way in which a social community perceives and experiences itself and its surroundings. Accordingly, for Rancière, politics "consists in refiguring space, that is in what is to be done, to be seen and to be named in it. It is the instituting of a dispute over the distribution of the sensible" (Rancière 2010, 37). A scientific analogy to that can be construed in the form of a *distribution of scientific resources*, an established scientific worldview which determines how humans conceptualize and thus conceive the world (or parts thereof).

Responsive and oppositional agonism can be used to interpret the developments at IPBES, and more specifically the evolution of IPBES' conceptual framework. On such a reading, the first two phases of IPBES' development were characterized by attempts at oppositional pluralization (mostly) by delegates of the Plurinational State of Bolivia. This attempted pluralization was unsuccessful in the first phase, when IPBES was established with a strong focus on ecosystem services. It was, however, successful in the second phase, where due to the Bolivian's forceful interventions a dualistic conceptual framework was adopted, and thereby IPBES' conceptual approach to nature was broadened. On the other hand, the adoption of the NCP framework during the third phase in IPBES' development, amounts to an institutionalization of critical responsiveness,

because through the context-specific perspective it provides a space in which further attempts at pluralization can occur. At the same time, a new fault line between generalized and context-specific perspective was established which might be contested in future acts of oppositional pluralization - indicating that these processes are ongoing and without end.

Overall, these observations suggest two consequences for philosophy of science. First, that it is worth studying the dynamic processes of pluralization in addition to static states of pluralism. Second, that in studying these processes it is fruitful to engage with the conflictual dimension emphasized in Rancière's oppositional account in more detail, since that dimension has been understudied within philosophy of science so far and offers potential for further insights into processes at the intersection of science and society.

Chapter 5
Conclusion

In this thesis, I have studied the development of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) to gain insights in the intertwinement of science and society. My goal was, furthermore, to conduct research which was informed and inspired by both philosophy of science and political theory. With regard to the latter, I have focused on a field of political thought which has so far barely been touched by philosophers of science, namely post-foundational thought and, more specifically, agonistic theories of democracy. Such theories emphasize deep pluralism, an inevitable but potentially productive role of conflict within society, and the importance of enabling the questioning and contesting of established authorities in order to prevent lasting domination and marginalization within a society.

Using the case of IPBES to study these issues has proven to be very fruitful. Both its establishment and further development were characterized by such a deep pluralism and conflicts about how to scientifically conceptualize the human nature relationship. In those conflicts, it became apparent how different perspectives (such as a perspective related to the ecosystem services concept and another one related to the mother earth approach) can be established in different strengths within science and society, an observation which related very well to the agonistic approach to values in science.

In my first paper, I focused on the ways in which value judgements can be inscribed in the very fabric of science and society. To capture this phenomenon, I developed the notion of particularities and distinguished three kinds of particularities. Furthermore, I argued that particularities present a challenge for accounts of democratizing science by distorting democratic procedures. My focus was then on the ways in which value judgements in science contribute to the establishment and reproduction of a specific, value-laden status quo and the ways in which those marginalized within that status quo can be impeded from changing it. I presented agonistic theories of democracy as a way to address this problem and derived several recommendations for the case of IPBES.

In my second paper, I attempted to follow up on the idea of a status quo which is pervaded by particularities and achieve an integration of philosophy of science and political theory which would allow to address the issue of values in science on a more

general level. To do this, I assessed Thomas Kuhn's theory of science and scientific change, and Claude Lefort's account of the constitution and development of society. I observed a fascinating similarity in their views on science and society, namely a Neo-Kantian understanding of the constitution of both science and society. My hope was that this similarity would allow combining both accounts, and thus to address the intertwinement of science and society within a unified framework. However, as it turned out, there is a substantial difference between Kuhnian and Lefortian thought which prevented me from achieving the kind of integration that I had hoped for. Kuhn's perspective on science is strictly monist, whereas Lefort emphasizes the importance of plurality in order to prevent lasting domination by any individual regime. Consequently, I turned towards Helen Longino's social value management ideal, which embraces the pluralistic commitment found in Lefort's work. Longino's account is strongly rooted in the political liberalism of John Stuart Mill, which had led me, when I first envisaged the paper, to decide against an attempt at combining her account with insights from agonistic theories. The Kuhnian approach had seemed more promising to me for that. Accordingly, I discovered that Longino's rootedness in Millian liberalism does create some problems for reconciling the case of IPBES with her perspective. These problems are due to the occurrence of conflictual interaction and the influence of particularities in IPBES' development. However, the previous discussion of Lefort's understanding of society allowed me to supplement Longino's account by some of his insights and thereby show a way to circumvent these problems.

Finally, in my third paper, I studied the last phase of IPBES' development and its overall development, leading from the process of its establishment up to the adoption of the new NCP framework. I argued, that this development should be seen as a process of pluralization. As such pluralization constitutes a disruption of an established status quo, agonistic thought with its corresponding focus on contestation and conflict can be useful for assessing it politically. To do that, I introduced two particular accounts form agonistic thought, namely William Connolly's *responsive agonism* and Jacques Rancière's *oppositional agonism*. Crucial element of Rancière's account is his notion of a *distribution of the sensible*, which also provides a way to link his political considerations to science. While the original notion is meant to capture the way in which a society experiences and perceives itself, science can be understood as providing an analogous

distribution of scientific resources which shapes the predominant way of conceptualizing and understanding the world within a society.

As I argued, IPBES' development exhibits both aspects which are best captured by Connolly's and by Rancière's approach. During its first and second phase, interactions between proponents of different approaches to human-nature-relationships were primarily oppositional. This oppositional approach to pluralization was even successful, since it resulted in the creation of IPBES' dualistic conceptual framework. The adoption of the NCP framework in the last phase can, however, be understood as an institutionalization of critical responsiveness much in line with Connolly's view on pluralization. As I have argued, these observations should motivate further philosophical studies of processes of pluralization and a greater focus on the so far somewhat neglected oppositional and conflictual dimension of such processes.

There is also a challenge arising from my overall choice of political theory, which I would like to briefly address. One of the biggest unsolved problems for the values in science discourse consists in what has been called the *new demarcation problem*, the challenge of demarcating an inevitable and legitimate influence of values on science from those influences that are epistemic distortions of the research process (Wilholt and Holman forthcoming). Agonistic political thought can be helpful for addressing issues related to values in science, once that demarcation has been done. In that regard, I consider it extremely rich and powerful. Not only are philosophers of science increasingly acknowledging a legitimate influence of values on the research process, actual scientific research has already been shaped by values for a long time. As in all social settings, that makes it susceptible to the emergence and reproduction of power differentials, inequalities, marginalization and discrimination. Developing ways to counter these is at the core of agonistic thought and it can thus provide much more helpful insights than other schools of thought from political theory. But with its emphasis on questioning and contesting authorities, it also has few inherent conceptual resources to offer for solving the demarcation problem. When not supplemented by an account from philosophy of science, it will rather allow for a very wide range of value influences on scientific research – a range that, from a perspective of philosophy of science, might be considered as comprising epistemic distortions that ought to be excluded from scientific research.

Additionally, due to its willingness to doubt any authorities, it is particularly difficult to retain a notion of scientific authority within an agonistic framework.

In this thesis, I have focused on what I consider the emancipatory potential of combining agonistic thought with philosophy of science. Consequently, I have made only a few remarks on issues related to the demarcation problem. Future work would need to address this challenge in more detail in order to be able to thoroughly combine philosophy of science and this kind of political theory. I hope to have created some motivation for such an endeavor.

Bibliography

Alexandrova, Anna. 2018. “Can the Science of Well-Being Be Objective?” *British Journal for the Philosophy of Science* 69 (2): 421–45.

Anderson, Elizabeth. 2004. “Uses of Value Judgments in Science: A General Argument, with Lessons from a Case Study of Feminist Research on Divorce.” *Hypatia* 19 (1): 1–24.

———. 2012. “Epistemic Justice as a Virtue of Social Institutions.” *Social Epistemology* 26 (2): 163–73.

Ankeny, Rachel A., and Sabina Leonelli. 2016. “Repertoires: A Post-Kuhnian Perspective on Scientific Change and Collaborative Research.” *Studies in History and Philosophy of Science Part A* 60: 18–28.

Arendt, Hannah. 1969. “Truth and Politics.” In *Between Past and Future*, 2nd ed. New York: Viking Press.

Bai, Changbo, Nienke Beintema, Bo-Alex Fredvik, and Charlotte Salpin. 2005. “A Summary Report of the International Scientific Conference ‘Biodiversity: Science and Governance.’” *Biodiversity: Science and Governance Bulletin* 100 (5).

Barnaud, Cécile, and Martine Antona. 2014. “Deconstructing Ecosystem Services: Uncertainties and Controversies around a Socially Constructed Concept.” *Geoforum* 56: 113–23.

Berlin, Isaiah. 1997. *The Proper Study of Mankind: An Anthology of Essays*. London: Chatto & Windus.

Betz, Gregor. 2013. “In Defence of the Value Free Ideal.” *European Journal for Philosophy of Science* 3 (2): 207–20.

Biddle, Justin. 2007. “Lessons from the Vioxx Debacle: What the Privatization of Science Can Teach Us About Social Epistemology.” *Social Epistemology* 21 (1): 21–39.

———. 2009. “Advocates or Unencumbered Selves? On the Role of Mill’s Political Liberalism in Longino’s Contextual Empiricism.” *Philosophy of Science* 76 (5): 612–23.

———. 2013a. “Institutionalizing Dissent: A Proposal for an Adversarial System of Pharmaceutical Research.” *Kennedy Institute of Ethics Journal*, 30.

———. 2013b. “State of the Field: Transient Underdetermination and Values in Science.” *Studies in History and Philosophy of Science Part A* 44 (1): 124–33.

———. 2016. “Inductive Risk, Epistemic Risk, and Overdiagnosis of Disease.” *Perspectives on Science* 24 (2): 192–205.

Biddle, Justin, and Rebecca Kukla. 2017. “The Geography of Epistemic Risk.” In *Exploring Inductive Risk: Case Studies of Values in Science*, edited by Kevin C. Elliott and Ted Richards, 215–37. Oxford University Press.

Borie, Maud, and Mike Hulme. 2015. “Framing Global Biodiversity: IPBES between Mother Earth and Ecosystem Services.” *Environmental Science & Policy* 54: 487–96.

Borie, Maud, and Denis Pesche. 2017. “Making the IPBES Conceptual Framework: A Rosetta Stone?” In *The Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES): Meeting the Challenge of Biodiversity Conservation and Governance*, edited by Marie Hrabanski and Denis Pesche, 135–53. Routledge.

Breckman, Warren. 2013. “Lefort and the Symbolic Dimension.” In *Claude Lefort. Thinker of the Political*, edited by Martín Plot, 176–85. London: Palgrave Macmillan UK.

Brown, Mark B. 2009. *Science in Democracy: Expertise, Institutions, and Representation*. Cambridge, Mass: The MIT Press.

Brown, Matthew J. 2020. *Science and Moral Imagination: A New Ideal for Values in Science*. Science, Values, and the Public. Pittsburgh: University of Pittsburgh Press.

Bueter, Anke. 2015. “The Irreducibility of Value-Freedom to Theory Assessment.” *Studies in History and Philosophy of Science Part A* 49: 18–26.

Celikates, Robin. 2010. “Ziviler Ungehorsam und radikale Demokratie.” In *Das Politische und die Politik*, edited by Thomas Bedorf and Kurt Röttgers. Suhrkamp-Taschenbuch Wissenschaft 1957. Frankfurt am Main: Suhrkamp.

Centellas, Miguel. 2013. “Bolivia’s New Multicultural Constitution: The 2009 Constitution in Historical and Comparative Perspective.” In *Latin America’s Multicultural Movements: The Struggle Between Communitarianism, Autonomy, and Human Rights*, edited by Todd Eisenstadt, Michael Danielson, Moises Jaime Bailon Corres, and Carlos Sorroza Polo, 88–110. New York: Oxford University Press.

Chan, Kai M. A., and Terre Satterfield. 2020. “The Maturation of Ecosystem Services: Social and Policy Research Expands, but Whither Biophysically Informed Valuation?” Edited by Unai Pascual. *People and Nature* 2 (4): 1021–60.

Chang, Hasok. 2012. *Is Water H_2O? Evidence, Realism and Pluralism*. Dordrecht; New York: Springer.

———. 2014. “Epistemic Activities and Systems of Practice. Units of Analysis in Philosophy of Science After the Practice Turn.” In *Science after the Practice Turn in the Philosophy, History, and Social Studies of Science*, edited by Léna Soler, Sjoerd Zwart, Michael Lynch, and Vincent Israel-Jost, 67–79. New York: Routledge.

Citton, Yves. 2009. “Political Agency and the Ambivalence of the Sensible.” In *Jacques Rancière: History, Politics, Aesthetics*, edited by Gabriel Rockhill and Philip Watts, 120–39. Durham: Duke University Press.

Connolly, William E. 1995. *The Ethos of Pluralization*. Minneapolis: University of Minnesota Press.

———. 2005. *Pluralism*. Durham: Duke University Press.

Costanza, Robert, Ralph d’Arge, Rudolf de Groot, Stephen Farber, Monica Grasso, Bruce Hannon, Karin Limburg, et al. 1997. “The Value of the World’s Ecosystem Services and Natural Capital.” *Nature* 387: 253–60.

Daily, Gretchen C., ed. 1997. *Nature’s Services: Societal Dependence On Natural Ecosystems*. 4th ed. Washington, DC: Island Press.

Dempsey, Jessica, and Morgan Robertson. 2012. “Ecosystem Services: Tensions, Impurities, and Points of Engagement within Neoliberalism.” *Progress in Human Geography* 36 (6): 758–79.

Díaz, Sandra, Sebsebe Demissew, Julia Carabias, Carlos Joly, Mark Lonsdale, Neville Ash, Anne Larigauderie, et al. 2015. “The IPBES Conceptual Framework - Connecting Nature and People.” *Current Opinion in Environmental Sustainability* 14: 1–16.

Díaz, Sandra, Sebsebe Demissew, Julia Carabias, Carlos Joly, Mark Lonsdale, Neville Ash, Anne Larigauderie, Jay Ram Adhikari, Salvatore Arico, and András Báldi. 2015. "The IPBES Conceptual Framework - Connecting Nature and People." *Current Opinion in Environmental Sustainability* 14: 1–16.

Díaz, Sandra, Sebsebe Demissew, Carlos Joly, W. Mark Lonsdale, and Anne Larigauderie. 2015. "A Rosetta Stone for Nature's Benefits to People." *PLOS Biology* 13 (1): e1002040.

Díaz, Sandra, Unai Pascual, Marie Stenseke, Berta Martín-López, Robert T. Watson, Zsolt Molnár, Rosemary Hill, et al. 2018a. "Assessing Nature's Contributions to People." *Science* 359 (6373): 270–72.

———. 2018b. "RE: There Is More to Nature's Contributions to People than Ecosystem Services - a Response to de Groot et Al." *Science E-Letter*, March. http://science.sciencemag.org/content/359/6373/270/tab-e-letters.

Dijstelbloem, Huub. 2014. "Science in a Not so Well-Ordered Society: A Pragmatic Critique of Procedural Political Theories of Science and Democracy." *Krisis* 1: 39–52.

Douglas, Heather. 2009. *Science, Policy, and the Value-Free Ideal*. Pittsburgh: University of Pittsburgh Press.

Dunkley, Ria, Susan Baker, Natasha Constant, and Angelina Sanderson-Bellamy. 2018. "Enabling the IPBES Conceptual Framework to Work across Knowledge Boundaries." *International Environmental Agreements: Politics, Law and Economics* 18 (6): 779–99.

Dupré, John. 2012. "The Inseparability of Science and Values." In *Processes of Life: Essays in the Philosophy of Biology*, 55–67. Oxford University Press.

Elliott, Kevin C. 2011. "Direct and Indirect Roles for Values in Science." *Philosophy of Science* 78 (2): 303–24.

Elliott, Kevin C. 2017. *A Tapestry of Values*. New York: Oxford University Press.

Elliott, Kevin C., and Daniel J. McKaughan. 2014. "Nonepistemic Values and the Multiple Goals of Science." *Philosophy of Science* 81 (1): 1–21.

Fleck, Ludwik. 1979. *Genesis and Development of a Scientific Fact*. Edited by Thaddeus J. Trenn and Robert K. Merton. Translated by Frederick Bradley and Thaddeus J. Trenn. Chicago: University of Chicago Press.

Fricker, Miranda. 2007. *Epistemic Injustice. Power and the Ethics of Knowing*. Oxford; New York: Oxford University Press.

Friedmann, Michael. 2002. "Kant, Kuhn, and the Rationality of Science." In *History of Philosophy of Science: New Trends and Perspectives*, edited by Michael Heidelberger and Friedrich Stadler, 25–41. Vienna Circle Institute Yearbook 9. Dordrecht: Kluwer.

Global Forest Coalition, CENSAT Agua Viva, COECOCEIBA, EQUATIONS, Alter Vida, and The Timberwatch Coalition. 2008. "Life As Commerce: The Impact of Market-Based Conservation on Indigenous Peoples, Local Communities and Women."

Gómez-Baggethun, Erik, Rudolf de Groot, Pedro Lomas, and Carlos Montes. 2010. "The History of Ecosystem Services in Economic Theory and Practice: From Early Notions to Markets and Payment Schemes." *Ecological Economics* 69 (6): 1209–18.

Gómez-Baggethun, Erik, and Manuel Ruiz-Pérez. 2011. “Economic Valuation and the Commodification of Ecosystem Services.” *Progress in Physical Geography: Earth and Environment* 35 (5): 613–28.

Guo, Zhongwei, Xiangming Xiao, and Dianmo Li. 2000. “An Assessment of Ecosystem Services: Waterflow Regulation and Hydroelectric Power Production.” *Ecological Applications* 10 (3): 12.

Hacking, Ian. 1982. “Language, Truth and Reason.” In *Rationality and Relativism*, edited by Martin Hollis and Steven Lukes, 48–66. Oxford: Blackwell.

———. 2012. “‘Language, Truth and Reason’ 30 Years Later.” *Studies in History and Philosophy of Science Part A* 43 (4): 599–609.

Haraway, Donna. 1988. “Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective.” *Feminist Studies* 14 (3): 575–99.

Harding, Sandra. 1991. *Whose Science? Whose Knowledge?: Thinking from Women’s Lives*. Ithaca, NY: Cornell University Press.

———. 1992. “After the Neutrality Ideal: Science, Politics, and" Strong Objectivity"." *Social Research*, 567–87.

Hicks, Daniel. 2011. “Is Longino’s Conception of Objectivity Feminist?” *Hypatia* 26 (2): 333–51.

Hill, Rosemary, Sandra Díaz, Unai Pascual, Marie Stenseke, Zsolt Molnár, and Julia Van Velden. 2021. “Nature’s Contributions to People: Weaving Plural Perspectives.” *One Earth* 4 (7): 910–15.

Hoyningen-Huene, Paul. 1993. *Reconstructing Scientific Revolutions: Thomas S. Kuhn’s Philosophy of Science*. Chicago: University of Chicago Press.

Hull, David L. 1988. *Science as a Process: An Evolutionary Account of the Social and Conceptual Development of Science*. Chicago; London: University of Chicago Press.

Ingram, James D. 2006. “The Politics of Claude Lefort’s Political: Between Liberalism and Radical Democracy.” *Thesis Eleven* 87 (1): 33–50.

Intemann, Kristen. 2011. “Diversity and Dissent in Science: Does Democracy Always Serve Feminist Aims?” In *Feminist Epistemology and Philosophy of Science: Power in Knowledge*, edited by Heidi Elizabeth Grasswick, 111–32. Feminist Philosophy Collection. Dordrecht; New York: Springer.

———. 2015. “Distinguishing between Legitimate and Illegitimate Values in Climate Modeling.” *European Journal for Philosophy of Science* 5 (2): 217–32.

IPBES. 2017. “Update on the Classification of Nature’s Contributions to People by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services.” Bonn.

———. 2019. *Global Assessment Report of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services*. Edited by E.S. Brondízio, J. Settele, S. Díaz, and H.T. Ngo. Bonn.

———. n.d. “About.” Accessed August 28, 2020. https://ipbes.net/about.

Jacques, Peter J., Riley E. Dunlap, and Mark Freeman. 2008. “The Organisation of Denial: Conservative Think Tanks and Environmental Scepticism.” *Environmental Politics* 17 (3): 349–85.

Jasanoff, Sheila. 2004a. “Ordering Knowledge, Ordering Society.” In *States of Knowledge: The Co-Production of Science and Social Order*, edited by Sheila Jasanoff, 13–45. London; New York: Routledge.

———, ed. 2004b. *States of Knowledge: The Co-Production of Science and Social Order*. London; New York: Routledge.
———. 2004c. “The Idiom of Co-Production.” In *States of Knowledge: The Co-Production of Science and Social Order*, edited by Sheila Jasanoff, 1–12. London; New York: Routledge.
Kadykalo, Andrew N., María D. López-Rodriguez, Jacob Ainscough, Nils Droste, Hyeonju Ryu, Giovanni Ávila-Flores, Solen Le Clec’h, et al. 2019. “Disentangling ‘Ecosystem Services’ and ‘Nature’s Contributions to People.’” *Ecosystems and People* 15 (1): 269–87.
Kalyvas, Andreas. 2009. “The Democratic Narcissus: The Agonism of the Ancients Compared to That of the (Post)Moderns.” In *Law and Agonistic Politics*, edited by Andrew Schaap, 15–41. Farnham: Ashgate.
Kitcher, Philip. 2001. *Science, Truth, and Democracy*. Oxford, New York: Oxford University Press.
———. 2011. *Science in a Democratic Society*. Amherst, New York: Prometheus Books.
Klein, Naomi. 2015. *This Changes Everything*. New York: Simon & Schuster.
Kosoy, Nicolás, and Esteve Corbera. 2010. “Payments for Ecosystem Services as Commodity Fetishism.” *Ecological Economics* 69 (6): 1228–36.
Kourany, Janet A. 2010. *Philosophy of Science after Feminism*. Studies in Feminist Philosophy. New York: Oxford University Press,.
Kuhn, Thomas S. 1996. *The Structure of Scientific Revolutions*. 3rd ed. Chicago, IL: University of Chicago Press.
Kull, Christian A., Xavier Arnaud de Sartre, and Monica Castro-Larrañaga. 2015. “The Political Ecology of Ecosystem Services.” *Geoforum* 61: 122–34.
Lackey, Robert T. 2007. “Science, Scientists, and Policy Advocacy.” *Conservation Biology* 21 (1): 12–17.
Lakatos, Imre. 1970. “Falsification and the Methodology of Scientific Research Programs.” In *Criticism and the Growth of Knowledge*, edited by Imre Lakatos and Alan Musgrave, 91–196. Cambridge: Cambridge University Press.
Larigauderie, Anne, and Harold A Mooney. 2010. “The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services: Moving a Step Closer to an IPCC-like Mechanism for Biodiversity.” *Current Opinion in Environmental Sustainability* 2 (1–2): 9–14.
Lefort, Claude. 1988. *Democracy and Political Theory*. Cambridge; Oxford: Polity Press.
———. 2000. *Writing. The Political Test*. Translated by David Ames Curtis. Durham, NC: Duke University Press.
Longino, Helen E. 1990. *Science as Social Knowledge: Values and Objectivity in Scientific Inquiry*. Princeton, N.J: Princeton University Press.
———. 2002. *The Fate of Knowledge*. Princeton, N.J.; Oxford: Princeton University Press.
Loreau, Michel, Alfred Oteng-Yeboah, M. T. K. Arroyo, D. Babin, R. Barbault, M. Donoghue, M. Gadgil, et al. 2006. “Diversity without Representation.” *Nature* 442 (7100): 245–46.
Lowndes, Vivien, and Marie Paxton. 2018. “Can Agonism Be Institutionalised? Can Institutions Be Agonised? Prospects for Democratic Design.” *The British Journal of Politics and International Relations* 20 (3): 693–710. https://doi.org/10.1177/1369148118784756.

Ludwig, David. 2016. “Ontological Choices and the Value-Free Ideal.” *Erkenntnis* 81 (6): 1253–72.
Mace, Georgina M., Ken Norris, and Alastair H. Fitter. 2012. “Biodiversity and Ecosystem Services: A Multilayered Relationship.” *Trends in Ecology & Evolution* 27 (1): 19–26.
Marchart, Oliver. 2007. *Post-Foundational Political Thought: Political Difference in Nancy, Lefort, Badiou and Laclau*. Edinburgh: Edinburgh University Press.
Martín-López, Berta. 2018. Berta Martín-López: The paradigm of nature’s contributions to people Interview by Paula Monroy. Future Earth Blog. https://futureearth.org/2018/04/18/berta-martin-lopez-the-paradigm-of-natures-contributions-to-people/.
McCauley, Douglas J. 2006. “Selling out on Nature.” *Nature* 443 (7107): 27–28.
McKaughan, Daniel J., and Kevin C. Elliott. 2013. “Backtracking and the Ethics of Framing: Lessons from Voles and Vasopressin.” *Accountability in Research* 20 (3): 206–26.
Mill, John Stuart. 2003. “On Liberty.” In *On Liberty*, edited by David Bromwich and George Kateb. Rethinking the Western Tradition. New Haven: Yale University Press.
Millennium Ecosystem Assessment, ed. 2005a. *Ecosystems and Human Well-Being: Synthesis*. Washington, DC: Island Press.
———, ed. 2005b. *Ecosystems and Human Well-Being: Synthesis*. Washington, DC: Island Press.
Mouffe, Chantal. 1999. “Deliberative Democracy or Agonistic Pluralism?” *Social Research* 66 (3): 745–58.
———. 2000. *The Democratic Paradox*. London, New York: Verso.
———. 2013. *Agonistics: Thinking the World Politically*. London, New York: Verso.
Nonhoff, Martin. 2012. “Institutionalizing Agonistic Democracy: Post-Foundationalism and Political Liberalism, by Ed Wingenbach.” *Critical Policy Studies* 6 (4): 480–82.
Okruhlik, Kathleen. 1994. “Gender and the Biological Sciences.” *Canadian Journal of Philosophy* 20: 21–42.
Oreskes, Naomi, and Erik M Conway. 2010. *Merchants of Doubt: How a Handful of Scientists Obscured the Truth on Issues from Tobacco Smoke to Global Warming*. New York: Bloomsbury Press.
Panagia, Davide. 2010. “‘Partage Du Sensible’: The Distribution of the Sensible.” In *Jacques Rancière: Key Concepts*, edited by Jean-Philippe Deranty, 95–103. Durham: Acumen.
Paxton, Marie. 2019. *Agonistic Democracy: Rethinking Political Institutions in Pluralist Times*. New York, NY: Routledge.
Pielke, Roger A. 2004. “When Scientists Politicize Science: Making Sense of Controversy over The Skeptical Environmentalist.” *Environmental Science & Policy* 7 (5): 405–17.
———. 2007. *The Honest Broker: Making Sense of Science in Policy and Politics*. Cambridge, New York: Cambridge University Press.
Pinto, Manuela Fernández. 2015. “Commercialization and the Limits of Well-Ordered Science.” *Perspectives on Science* 23 (2): 173–91.
Plurinational State of Bolivia. 2010. *Law of the Rights of Mother Earth (Law 071)*.

———. 2013. “Conceptual Framework for the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services.”
Putnam, Hilary. 2002. *The Collapse of the Fact/Value Dichotomy and Other Essays*. Cambridge, MA: Harvard University Press.
Rancière, Jacques. 1999. *Disagreement: Politics and Philosophy*. Minneapolis: University of Minnesota Press.
———. 2004. *The Politics of Aesthetics: The Distribution of the Sensible*. Translated by Gabriel Rockhill. London, New York: Continuum International Publishing Group.
———. 2010. *Dissensus: On Politics and Aesthetics*. Translated by Steven Corcoran. London, New York: Continuum International Publishing Group.
Reiss, Julian. 2017. “Fact-Value Entanglement in Positive Economics.” *Journal of Economic Methodology* 24 (2): 134–49.
Robertson, Morgan. 2012. “Measurement and Alienation: Making a World of Ecosystem Services: Measurement and Alienation.” *Transactions of the Institute of British Geographers* 37 (3): 386–401.
Rouse, Joseph. 1996. “Beyond Epistemic Sovereignty.” In *The Disunity of Science: Boundaries, Contexts, and Power*, edited by Peter Galison and David J. Stump, 398–416. Stanford: Stanford University Press.
Rudner, Richard. 1953. “The Scientist Qua Scientist Makes Value Judgments.” *Philosophy of Science* 20 (1): 1–6.
Schönwitz, Tobias. forthcoming. “Values in Science, Biodiversity Research, and the Problem of Particularity.” *Kennedy Institute of Ethics Journal*.
Schroeder, S. Andrew. 2017. “Using Democratic Values in Science: An Objection and (Partial) Response.” *Philosophy of Science* 84 (5): 1044–54.
———. 2020. “Thinking about Values in Science: Ethical versus Political Approaches.” *Canadian Journal of Philosophy*, 1–10.
Schröter, Matthias, Emma van der Zanden, Alexander van Oudenhoven, Roy Remme, Hector Serna-Chavez, Rudolf de Groot, and Paul Opdam. 2014. “Ecosystem Services as a Contested Concept: A Synthesis of Critique and Counter-Arguments.” *Conservation Letters* 7 (6): 514–23.
Solomon, Miriam. 2001. *Social Empiricism*. Cambridge, Mass: MIT Press.
Steele, Katie. 2012. “The Scientist qua Policy Advisor Makes Value Judgments.” *Philosophy of Science* 79 (5): 893–904.
Sullivan, Sian. 2009. “Green Capitalism, and the Cultural Poverty of Constructing Nature as Service Provider.” *Radical Anthropology* 3: 18–27.
Tully, James. 2002. “The Unfreedom of the Moderns in Comparison to Their Ideals of Constitutional Democracy.” *The Modern Law Review* 65 (2): 204–28.
———. 2008. *Public Philosophy in a New Key*. Cambridge, New York: Cambridge University Press.
———, ed. 2014. “On Global Citizenship.” In *On Global Citizenship. James Tully in Dialogue*, 1–100. London, New York: Bloomsbury.
Turnhout, Esther, Claire Waterton, Katja Neves, and Marleen Buizer. 2013. “Rethinking Biodiversity: From Goods and Services to ‘Living With.’” *Conservation Letters* 6 (3): 154–61.
UNEP. 2008. “Report of the Ad Hoc Intergovernmental and Multi-Stakeholder Meeting on an Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem

Services." UNEP/IPBES/1/6. https://ipbes.net/sites/default/files/downloads/UNEP_IPBES_3_3_EN.pdf.
———. 2009. "Gap Analysis for the Purpose of Facilitating the Discussions on How to Improve and Strengthen the Science-Policy Interface on Biodiversity and Ecosystem Services." UNEP/IPBES/2/INF/1. https://ipbes.net/sites/default/files/downloads/UNEP_IPBES_2_INF_1.pdf.
———. 2010. "Report of the Third Ad Hoc Intergovernmental and Multi-Stakeholder Meeting on an Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services." UNEP/IPBES/3/3. https://ipbes.net/sites/default/files/downloads/UNEP_IPBES_3_3_EN.pdf.
———. 2011. "Report of the First Session of the Plenary Meeting to Determine Modalities and Institutional Arrangements for an Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services." UNEP/IPBES.MI/1/8. https://www.ipbes.net/system/tdf/downloads/UNEP_IPBES_MI_1_8_EN_1.pdf?file=1&type=node&id=13980.
———. 2012a. "Report of the Second Session of the Plenary Meeting to Determine Modalities and Institutional Arrangements for an Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services." UNEP/IPBES.MI/2/9. https://www.ipbes.net/system/tdf/downloads/UNEP_IPBES_MI_2_9_EN_0.pdf?file=1&type=node&id=13968.
———. 2012b. "Outcome of an Informal Expert Workshop on Main Issues Relating to the Development of a Conceptual Framework for the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services." https://www.ipbes.net/system/tdf/downloads/IPBES_1_INF_9.pdf?file=1&type=node&id=12467.
United Nations. 1992. *Convention on Biological Diversity*. https://www.cbd.int/convention/text/.
———. 2012. "The Future We Want." Outcome Document of the United Nations Conference on Sustainable Development. https://sustainabledevelopment.un.org/content/documents/733FutureWeWant.pdf.
Vadrot, Alice. 2014a. "The Epistemic and Strategic Dimension of the Establishment of the IPBES: 'Epistemic Selectivities' at Work." *Innovation: The European Journal of Social Science Research* 27 (4): 361–78.
———. 2014b. *The Politics of Knowledge and Global Biodiversity*. London, New York: Routledge.
Watson, Robert. 2005. "Turning Science into Policy: Challenges and Experiences from the Science–Policy Interface." *Philosophical Transactions of the Royal Society B: Biological Sciences* 360 (1454): 471–77.
Wenman, Mark. 2013. *Agonistic Democracy: Constituent Power in the Era of Globalisation*. Cambridge: Cambridge University Press.
Westphal, Manon. 2019. "Overcoming the Institutional Deficit of Agonistic Democracy." *Res Publica* 25 (2): 187–210.
Weymans, Wim. 2005. "Freedom through Political Representation: Lefort, Gauchet and Rosanvallon on the Relationship between State and Society." *European Journal of Political Theory* 4 (3): 263–82.
Wilholt, Torsten. 2009. "Bias and Values in Scientific Research." *Studies in History and Philosophy of Science Part A* 40 (1): 92–101.

———. 2013. “Epistemic Trust in Science.” *The British Journal for the Philosophy of Science* 64 (2): 233–53.
———. 2014. “Philip Kitcher, Science in a Democratic Society.” *Philosophy of Science* 81 (1): 165–71.
———. 2016. “Collaborative Research, Scientific Communities, and the Social Diffusion of Trustworthiness.” In *The Epistemic Life of Groups: Essays in the Epistemology of Collectives*, edited by Michael Brady and Miranda Fricker, 218–33. Oxford: Oxford University Press.
Wingenbach, Ed. 2011. *Institutionalizing Agonistic Democracy: Post-Foundationalism and Political Liberalism*. Surrey, Burlington: Ashgate.
Wylie, Alison. 2003. “Why Standpoint Matters.” In *Science and Other Cultures: Issues in Philosophies of Science and Technology*, edited by Robert Figueroa and Sandra G. Harding, 26–48. Routledge.
Young, Iris Marion. 1990. *Justice and the Politics of Difference*. Princeton, N.J: Princeton University Press.

Acknowledgements

I would first of all like to thank my supervisor Torsten Wilholt, whose philosophical work has sparked my initial interest in the intertwinement of science and society and the role of values in science. Furthermore, I would like to thank Justin Biddle, who agreed to act as a second supervisor and has inspired my thinking through his writings even before that relationship became formally established.

The Institute of Philosophy at the LUH and all the people who belong to it have been in my life for more than ten years now. And even though I have grown away lately, I am very grateful for having become inspired to pursue philosophy there and for all the time I have spent and all the encounters I have had there. The DFG Graduiertenkolleg "Integrating Ethics and Epistemology of Scientific Research" has provided conditions for pursuing a PhD which are among the most privileged in academia. I am thankful to both Rafael Ugarte Chacon and Leonie Wiemeyer for making all administrative matters run so smoothly and for their general support. I send greetings to Enno Fischer, Markus Ahlers, Daria Jadreskic, Martin Wasmer, Anna Leuschner, Stefano, Canali, David Hopf, and Julia Pfeiff.

Throughout my doctorate, I have worked in various capacities at the Volkswagen Foundation. I am very grateful for these experiences, and I am happy that my path there has now reached a point where I look forward to the future with great anticipation. I would especially like to thank Anorthe Wetzel, Ulrike Bischler, Henrike Hartmann, and Hanna Wielandt for their support and encouragement.

One often hears that a PhD is a rather solitary and at times depressing endeavor. I have experienced this to be true to an extent that I did not imagine beforehand. And I am ever more thankful to the people who have made all the difference to me during that time.

Prime among these difference makers have been Heike, Johannes K., Paul Hendrik, Janis, Hannah, Tobi, Joscha, and my siblings, Andi and Annika. My life also changed quite a bit when I went to a play of moa in 2017. I am very grateful for the coincidence that brought together a rather clueless myself, bad weather, and a group of people who welcomed me without any hesitation and as warmly as one could imagine. Of course, now I know that the latter has been no coincidence at all. Many thanks to Fritzi, Thomas,

Bille, Katrijn, Tim, Stephan, Lisbeth, Nici, Rüdiger, Hans-Holger, Schmiddi, Werner, Polina, Janosch, Mareike, Mandana, and Katja for making moa what it is. I am furthermore thankful to every member of Stuthe and Josi, Mimi, Annalena, and Bärbel in particular.

For large parts of this work, I was accompanied by Larissa, and I am most thankful for her unwavering support during this time.

Maline and René have become dear to me, and I am very happy about sharing a home with them, and, above all, so many moments from my and their life. And the Elo has by now become a second home for me. I am most thankful for having met Lilly, Volker, Frida, Nelson, Gerd, Marco, Bärbel, Mika, Alex, Lea and Lorenz and for them welcoming and including me like they did. Finally, with Freddy, Nele, Nikias, Johannes S., and Christin, I share the joy of creating a future home together. This has already been a wonderful experience, and I look forward to everything that is yet to come.

Even though finding words to express myself has been a constant task for the past few years, I now struggle to find the right ones. Sharing my life with Lisa means so much more to me than I am able to capture in these few words. At this point, I will thus only say that I feel deeply grateful for having you in my life.

Handing in this dissertation marks the closure of a period of more than seven years, stretching back to my late studies. Throughout that time, my parents have always been there for me, and I have always known and felt this. Much of who I have become is due to their unconditional love and support.

I feel truly fortunate.