7. THE MATERIALIZATION OF POTENTIALITY

“We do not obtain knowledge by standing outside of the world; we know because “we” are of the world.”

7.1 Introduction

The discussion on energy security and its drivers security and scarcity, so far hint at a primarily social and linguistically oriented understanding of energy security. Part I discussed energy security in terms of its conceptual evolution, its comparison with food security, and its analytical approaches and logics. In Part II, security was described as an ordering principle in society, with one theory focusing on speech acts and rejecting the material aspect of security as of no consequence at all. Likewise, scarcity was described as a social practice based on the mimesis of relative desire and as a norm that supports current modes of reasoning behind our modern-day political economy. What seems to be drifting out of focus in the chapters so far is any attention to the different material aspects underlying the questions of food and energy security. This includes the actual supplies of energy and food that dissuade security concerns; it includes the shortages that are still prevalent, even though scarcity no longer touches upon this solely; and it includes the rigid and durable material infrastructure of energy and food systems, which handles its production, transport and consumption. In the case of oil, this infrastructure ranges from the sulfur and nitrogen content to the overall quality of the resources, the depth of the wells, the size of the reserves, the distance to the markets, the infrastructure in place to refine and transport it, and so on.2

This chapter focusses on the social literature that discusses the relationship between knowledge (over energy systems) and materiality (of energy systems). It does not argue that either material or social explanations are better, but it tries to question and understand their relationship. Based on a discussion of both the critical constructivist literature and an analysis of different “new” materialist theories, this chapter puts forward four arguments. First, that the dialectical representation of matter and thought (mind-body/nature-society) is an artificial understanding that is simultaneously overblown in theoretical discussions on post-structural and constructivist research, and yet still a necessary distinction to better understand processes of becoming (performativity). Second, when the material and social are able to perform each other, they are open to a virtuality and eventfulness on both sides. Such an eventfulness calls for a politics of ontology: the politics dealing with

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1 Barad 2003, 829.
2 Bridge 2008.
the identification of what the event is. Based on the epistemological argument that it is impossible to know what is “out there”, this calls for a relational understanding of the world devoid of substance and objects except those that are created relational. Third, such a relational identification is based on distinctions. With these distinctions come exclusions and the subsequent need to be aware of the ethics of observation. In short, fourth, while new materialist theories argue for additional attention to matter, they ultimately also discuss knowledge gathering practices, like linguistic post-positivists, albeit in terms of durability and materialization. In other words, they offer an account based on the materialization of potentiality, but have to concede that this only matters because of human driven politics.

Unfortunately, this means that the already abstract discussion on energy security will turn even more abstract as discussions on materialism and discourse cannot be separated from commentaries on, for example, the forms of agency or the dualisms between object-subject and nature-culture. The easiest way to introduce these theoretical discussions is by categorizing the different positions into three distinct positions: between positivist scholars, post-positivists scholars, and new materialist or post-human scholars. Where positivist inspired research includes realist and liberalist theories with their assumption of a material world-out-there that can be studied objectively, post-positivism consists out of a range of post-structuralist and constructivist theories that disagrees with this and favor the (structured) social knowledge people have of the world over the material world itself. Lastly, recent theoretical developments outside IR gathered under the heading of “new materialism”, in fields as diverse as sociology (Actor-Network Theory (ANT)), feminism (Agential Realism), philosophy (Object Oriented Ontology (OOO)), anthropology and history (material culture), introduce a post-humanist view. A perspective that is geared towards the ability to analyze the material world in its becoming, instead of an exclusive focus on human social interaction (as post-positivist).3 Within IR, a small but growing number of articles takes up these insights.4

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3 Some of the main works are: on Actor-Network Theory Latour 2005b; Law 1992; Law 2007; On Vital Materialism Bennett 2010b; Coole and Frost 2010b; On Agential Realism see Barad 2003; Barad 2007; On Object Oriented Ontology Harman 2009; Bryant, Srnicek, and Harman 2011; On Material Culture see Miller 2005. General work includes: Coole and Frost 2010b; Braun and Whatmore 2010a; Cudworth and Hobden 2011. These authors depart from the old definition of “materialism”, a term used to describe a theoretical framework that depicts the world to exist out of matter, energy and material interactions whereby all social interactions can be explained by material processes. Also note that there is quite some resistance against the use of the term of ‘a material turn’ as it is claimed that the material has never left (how could it?), and as such cannot ‘(re)turn’. Interestingly, it is a similar argument that can be made against the concept of the ‘linguistic turn’.

4 Aradau 2010; Schouten 2014; Cudworth and Hobden 2011; Voelkner 2011; See also the special issue by Millennium: Srnicek, Fotou, and Arghand 2013; including the article by Connolly 2013. Recent articles in IR with an explicit but more traditional focus on ‘the material’ include: Sorensen 2008; Aradau 2010; Meyer and Strickmann 2011; McCarthy 2011; McCarthy 2013. On Historical Materialism and Neo-
The chapter is constructed as follows. Chapter 7.2 will analyze the post-positivist rejections of positivism. It will briefly describe the main epistemological argument and discuss the differences of opinion between critical realists and radical constructivists on the role of scientific knowledge within such an epistemological position. It closes with a brief discussion of two highly abstract linguistic and social structural scholars to see whether these really do reject the material world as argued by some new materialist scholars. Chapter 7.3 moves to the new materialist critique on post-positivist theories and discusses why new materialist believe a focus on the material is important, what matter is, and how this can be approached by offering a performative understanding of the interaction between matter and knowledge. Chapter 7.4 delves into new materialist theory by introducing a relational ontology as proposed by Actor-Network Theory; it then pushes the new materialist literature by following the critique on ANT, in particular, its difficulty to discuss the virtuality and actuality of its relations (change and stability). This is taken up by discussing the vibrancy of the material in terms of a politics of ontology through an eventful folding and the politics of closure. Chapter 7.5 introduces the work of Barad on Agential Realism to discuss the observational ethics of such a material discursive folding. The reflection summarizes and reflects on the theoretical debates by setting the stage for the next chapter.

7.2 Knowing of Objects

7.2.1 Observing “The World”

Discussions on the role of the material are often phrased in terms of the ability of people to know the outside material world. While this is self-evident for positivist scholars, there is more to it for post-positivist scholars. This chapter takes up this debate by first exploring how the social-material divide is discussed within IR theory as a preamble to the subsequent sections on new materialism. It will subsequently introduce the post-positivist argument on the importance of the role of language/knowledge/discourses in structuring the behavior and actions of society and its agents. It introduces the epistemological argument that it is impossible to gain neutral knowledge over the (outside) world because all knowledge one gains is mediated by previous historic decisions on what constitutes “good” knowledge. After briefly describing the differences between positivism and post-positivism and the underlying Cartesian dualist dilemma in discussions on the social-material problématique, this chapter, thirdly, contrasts the two main post-positivistic positions within IR theory, namely critical realism and radical constructivists. In contrasting these two positions,
and by pushing the radical constructivists position through a short discussion of Wittgenstein’s language games and Luhmann’s communicative systems, it becomes possible to question the social essentialism of which radical constructivists are accused by scholars from the ‘new materialist turn’.

Foremost, however, it is important to note that even to ask the question how the material world can be known, means that one already has to presuppose ontologically that there is a distinction between knowledge and matter. The question itself is not neutral and presupposes a specific dualist world where matter is separated from knowledge. This dualism is most famously known as the Cartesian mind-body dualism. It is based on the epistemological insight that we can know, for certain, that we are able to think and thus that our mind exists, but that we cannot know whether our bodies exists.\(^5\) The ontological dualist position of Descartes is not the only dualist (or monist) ontological choice possible, but one that is very common in everyday language use. Importantly, it leads to the question of causality between the mind and the body. In a mind-body dualism: (1) the mind could be an independent non-bodily phenomenon, (2) the mind and body could be causally linked (either through minds or through bodies), or (3) the physical is an independent causally closed phenomenon. All three options are plausible, but the Bieri trilemma states that only two can ever be consistent with one another.\(^6\)

The philosopher Searle, for example, argues for a form of physicalism (a combination of 2 and 3) that is based on an ontological differentiation of ‘brute facts’ and social ‘institutional facts’\(^7\). Where the rocks and pebbles on the ground are brute material facts, he argues that ‘there are portions of the real world, objective facts in the world, which are only facts by human agreement. In a sense there are things that exist only because we believe them to exist.’\(^8\) The money in your wallet or the government people pay taxes to both are a fact of life and exist in reality, but only because we all agree on them. If, for some reason or another, people stop believing in these ‘social facts’ they cease to exist.\(^9\) Between brute and social facts, Searle identifies four categories, which he distinguishes on the relative importance of the collective assignment of function. In other words, to what extent humans create those facts by assigning a function to it. The first two categories are: (1) natural and

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\(^5\) Robinson 2012.
\(^6\) Kessler 2007; Bieri 1981. For example, when combining (1) and (2) one enters a classic dualist position described as interactionism where mind and body can interact freely; similarly, a combination of (2) and (3) is described as physicalism and stands for an approach where the mind is seen as part of the body but not reducible to it; and, lastly, a combination of (1) and (3) results in epiphenomenalism, where the mental is seen as a by-product of the physical without any causal effects at all.

\(^7\) Searle 1995, 2, 7.

\(^8\) Ibid., 1.

\(^9\) Ibid., 2.
biological systems that continue whether humans interpret them correctly or not; and
(2) material products or artefacts that are “real” but need human interpretation to
function, for example, chairs and hammers. The last two categories are ‘institutional
facts’: facts that do not exist without human interpretation. Searle divides these into
(3) non-linguistic facts like money and (4) linguistic facts based on written or spoken
language, for example business contracts. According to Searle, these brute and
social facts are erected iteratively on top of each other, meaning that all institutional
facts can be traced to some brute factual origin. He describes this in terms of the
formula X counts as Y in C: every institutional fact Y is built in a certain context C
upon a previous social fact X, which in turn is built upon another previous social fact
Y-1 in Context C-1, all the way down to some brute fact X.

Within the social sciences, including IR, these questions and positions on whether
people can observe the outside world return in debates between positivist and post-
positivist approaches to research. Positivism and post-positivism are epistemological
positions (e.g. ‘how do we know’) that always already include ontological assumptions
(e.g. on ‘what exists’). On the one hand, the positivism of realist and liberalist theories
(chapter 4) is often presented in combination with an ontological belief of naturalism.
That there is a given, pre-determined natural/physical reality ‘out there’ that can be
experienced and explained through the senses of the observer (the human subject,
whether academic or participant) who is clearly separated from the observed object.

This epistemological claim, that it is possible to study the outside world by creating a
true representation based upon humankind’s experiences, is called empiricism. The
latter should not be confused with positivism itself, which calls for a scientific method
consisting of law-like-generalizations and causal facts to analyses these experiences.
Positivism hence rest upon a clear dualist ontology that assumes that the mind, in time,
can mirror the material world it observes. On the other hand, post-positivist scholars
reject this dualist epistemological position based upon a critique on the separation
between observers and observed. Scholars from constructivist, critical, feminist and
post-structural approaches all argue that reality (which they do not reject), or, to be
precise, the experiences of reality, can only be “witnessed” by interpreting the events
through the knowledge that humans already possess. These scholars view knowledge,

10 Ibid., 121.
11 Ibid., 55–56.
12 Not everybody accepts this distinction. In security studies for example, Booth prefers to discuss the
distinction between these two approaches in terms of ‘naturalism’ (the positivist idea that the methods
used to study nature can be applied to human society as well) and ‘postnaturalism’ (a post-positivist
position that rejects such a one on one copying of methods). See Booth 2005, 10.
13 Patomäki and Wight 2000, 216–218. Naturalism is sometimes also described as realism, which, in turn,
is not the same as materialism.
14 Jackson 2008, 132–133 also describes this position as ‘classical objectivity’, meaning before quantum
mechanics, before post-structuralism and before the linguistic turn.
in other words, as something that is inherently social (not an individual or factual experience) and can only be shared through language in describing, defining and categorizing the world around us. This implies that all new knowledge is filtered by that what we already know. New knowledge is therefore not an actual representation of the world 'out there', but a consequence of historically developed and socially agreed constructions of what the world is and how it should look like. From this, it logically follows that no research is value free and that researchers should focus on the consequences of these linguistic structures and their constant performativity.

7.2.2 Critical Realism

Cox famously describes the distinction between positivist and post-positivist theories as one between (positivist) problem-solving theories and (post-positivist) critical theories.\(^\text{15}\) Where the former accepts the world as a given and tries to improve upon it, the latter attempts to stand outside the framework of analysis or action it is exploring and seeks to appraise it in terms of its origins, development, institutions, and its potentiality for change.\(^\text{16}\) Within post-positivist IR research, there are currently two meta-philosophical positions that struggle with the above ontic-epistemological questions. While both critical realism and radical constructivism agree on the intersubjectivity of knowledge and the role of linguistic structures, they disagree on the consequences of such a position and the role that scientific knowledge plays in this. This section discusses critical realism whereas the next section will discuss radical constructivism.

Critical realism is a meta-philosophical position originally developed by Bhaskar, which resembles the ontology of Searle to some extent.\(^\text{17}\) In the last decade, it has been reinvigorated in IR with contributions from Wight and Patomäki, amongst others.\(^\text{18}\) Critical realists hold that while a true representation of the world (e.g., empiricism and the so-called correspondence theory of truth) is indeed impossible, it is nonetheless possible to use a scientific method to study objectively the experiences people have of the world. Although it is impossible to know for sure that our images of reality are an exact representation of the world out there, critical realist believe that scholars should at least try to improve the theories they have. For them, falsification and verification are still the best methods to gain knowledge, ask new questions and reject less plausible answers. This argument is supported by two claims: first, by the 'practical success of scientific knowledge,' which is demonstrated when scientists manipulate otherwise unobservable entities.\(^\text{19}\) Second, with reference to an 'ordinary

\(^{15}\) Cox 1981.  
\(^{16}\) Booth 2005, 11.  
\(^{17}\) Bhaskar 2005.  
\(^{18}\) Wight 2007b; Wight 2007a; Patomäki and Wight 2000; Wight 2012; Joseph and Wight 2010.  
\(^{19}\) Wight 2007b, 383. Here Wight also rejects an absolute correspondence theory of truth but does see merit in an 'approximate truth.'
language use’ argument, as ‘scientific practice itself assumes a depth to reality that it investigates in order to provide explanations of empirical phenomena.’ By combining these arguments with the epistemological lesson that ‘knowledge itself is a social product’, one that is ‘dynamically produced by means of prior knowledge’, Wight claims that knowledge itself is an ‘inherently fallibilist enterprise’ based upon ‘rational choices between competing knowledge claims.’ In other words, critical realist believe that it is in the nature of human beings to constantly strive for “better” theories and descriptions, and hence that research should be based on a method of trial and error following observations and rational assessment. This focus on ‘ontological realism’ (a reality that can be experienced independently of the mind), ‘epistemological relativism’ (that this reality can only be described with ‘potentially fallible socially produced beliefs) and ‘judgemental rationalism’ instead of empiricism (that it is possible to judge between social theories), describes more or less the position currently taken by (soft or thin) social constructivists in IR.

Based on the meta-philosophy of critical realism, (thin) social constructivism is an IR theory that Adler once described as taking a ‘middle ground’ between positivist and post-positivist research. There are many authors working on social constructivism, but the theory most attentive to the material world and nearest to Searle’s brute and social facts is the one proposed by Wendt. With his concept of ‘rump materialism’ Wendt is one of the few IR scholars who explicitly tries to take both the material and the social into account. For Wendt’s social constructivist theory, the material plays a role following bodily differences, technological differences and geographical and natural characteristics. More specific, Wendt’s rump materialism rests upon a distinction between two different needs. On the one hand, biologically prescribed needs for food, water, shelter, etc., and, on the other hand, socially induced interests. As discussed in the chapter on scarcity, this distinction between needs/wants is questionable. This is confirmed by Wendt in the end as well when he claims that the core shared assumptions within constructivist approaches are that (1) the structures of human association are determined primarily by shared ideas rather than material forces, and (2) that the identities and interests of purposive actors are

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20 Ibid.
21 Ibid., 386.
22 The terms in brackets are from Patomäki and Wight 2000, 224; compare with Jackson 2008. Other scholars working from this position include Wendt 1999; Adler 2002; Wight 2007b.
23 Adler 1997. The term constructivism, might in fact been wrongly chosen as constructivism (as opposed to constructionism) was a term already in use in mathematics.
24 Wendt 1999.
25 Ibid., 111. Real does not imply materiality as explained above.
26 Ibid., 110; Sorensen 2008, 10.
constructed by these shared ideas rather than given by nature. Thus, while Wendt’s social constructivism shifts the attention away from the use of language towards the relationship between ideas and (material) interests, he too places the social over the material by claiming that the meaning objects have for people are more important than the objects themselves.

While critical realism and (thin) social constructivism seem coherent theories at first, Jackson, in a recent article, argues that many of these critical realists, while adhering to the epistemological logic that it is impossible to have an objective representation of the world actually only pay lip service to it and betray this logic at a later stage in their argument. As Jackson argues, not because they secretly refer to some form of representationalism between the social and the natural, but because these scholars with their focus on hypothesis testing and the constraining effects of the ‘outside’ world reinstall a dualism between an object and observer. They artificially create a distance to fulfil their desire to observe objectively.

7.2.3 Radical Constructivism

Radical post-positivists reject this distinction and the resulting scientific method, because they claim that the social, the intersubjective knowledge that people have in-between themselves, cannot be explained by it in any meaningful way. To these scholars, the “social world” consists out of intersubjective knowledge (whether called social facts, discourses, practices, fields or a similar concept) and does not have the same characteristics as the “natural world”. The staunchest proponents of this position even go so far as to argue that, while reality might exist, we can never know about it and as such should forgo the search for this holy grail and instead focus on the use and misuse of knowledge, whether in the form of language, discourse or practices.

A linguistic oriented post-positivist scholar could very well argue that there is no role at a linguistic level for the inclusion of a passive but changing material world, because to them it is not important whether it is nature or society that “acts”. Not that radical constructivism rejects the event itself, only that it believes that it is more important who interprets these events, at what moment and for what reasons. When a volcano erupts in the South Pacific or in Northern Italy the last is seen (e.g. interpreted) as more important because it endangers human life. A similar eruption on Iceland would matter less in terms of human life, where it not that all air traffic across the

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28 Ibid., 1.
29 Wendt 1999, Sorensen 2008, 10. Wendt is not alone on this, other social constructivist scholars take a similar position, see: Hopf 1998; Tannenwald 2005; Guzzini 2000; Adler 2002; Checkel 1998; Reus-Smit 1996.
31 See for example the illustrative, perhaps even ironic, subtitle of Kessler 2012b.
Atlantic could be hindered by it. The position that the material only matters through the knowledge people have of it and that one cannot separate objects from subject, is favored by radical constructivists as well as post-structuralists, and, to a lesser extent, critical theorists. Such a radical constructivist position within IR has a broad grounding in the work of French post-structuralism and the Frankfurter Schule. For reasons of space and argument, this section will reflect upon the role of language by briefly discussing two other strongly linguistic oriented scholars, neither of them part of the above traditions. After discussing Wittgenstein’s language games and Luhmann’s communicative Social Systems, this section moves to IR and the response of Kratochwil and other radical constructivist IR scholars to critical realism. Through these discussions this section highlights how meaning is ascribed, how observations should be seen as the production of distinctions, and how these two arguments together make all judgements ultimately value judgements and a matter of politics.

To understand how meaning is ascribed to events based on the knowledge that people possess, it is helpful to turn to the later writings of Wittgenstein on language games and his understanding of the grammar that enables the interactive and iterative meaning as use. Simplistically, people describe the world using concepts and words. The meaning of these concepts stems from its use and its (family) relationship with other concepts within a shared “grammar” or set of rules that clarify acceptable combinations. These combinations and their shared “grammar” mark different language games. For example, the concept of energy shifts meaning for a physicist (joules), a consumer (light/heath) or an oil trader (demand/supply) as each of these take place within a particular language game: respectively, natural science, bodily experience/survival and markets. Consequently, it is only in their constant use and with repeated reference to other words that concepts gain and are able to keep a particular meaning. Even when people object to a meaning, they still use that concept and thereby reinforce the overarching language game. Language games thus presume multiplicity, a world where a concept means different things within different contexts. As long as they are continuously interpreted in their ongoing use, these worlds are never entirely defined and cannot be closed off from other agents. In fact, agents constantly participate in multiple, sometimes even contrasting worlds.

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33 Kratochwil 2000; Kratochwil 2007b; Kessler 2012b; Fierke 2002; Milliken 1999.
simultaneously. A physicist working on energy is also a consumer of energy at home. It follows that agents are able to reflect on and compare between language games. However, they can only do so from within a third language game. A person can only observe a phenomenon from another set of rules, never from within the language game itself.

A similar, even more radical argument can be found in Luhmann’s *Systems Theory*. Luhmann offers a theory that perceives the world as divided into physical systems, psychic systems and social systems. Of these three, Luhmann has written most extensively on social systems and, in particular, on the role of communication in and between social systems. According to Luhmann all communication between two humans, or more precise between two Ego’s (psychic systems of cognition), takes place within social systems made up of modes of communication. Luhmann sees social systems as self-regulating entities that are based on a distinction between the system (inside) and the environment (outside). These distinctions are autopoietic: each system is based on a self-referential distinction that (re)produces or constitutes the meaning that a system attaches to itself and its environment.

Each system closes itself off from its complex ‘environment’ by constantly (re)drawing its boundaries through a reconfiguration of its own specific identity (designed to reduce the outside complexity). From this ontology it follows that all communication *between* systems should, according to Luhmann, be seen as an internal debate within a particular system over the interpretation of the stimulus witnessed in its environment. Because language “stores” meaning, new communications between systems can only be incorporated in a system if it fits or builds upon the already existing autopoietic constituted distinction (something Luhmann calls operational closure). For Luhmann, observation is thus a constant process of producing and

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38 Luhmann defines communication broadly: language, writing, art, silence, gestures, etc., everything that has or contains meaning for the entities using it to communicate.

39 In the act of observing or constituting a distinction, a system thus creates an observer (e.g. subject-object distinction). This implies that Luhmann’s systems can never be analysed from within, but only in its comparison (making new distinctions) with other social (sub) systems or from inside a third overarching social system. See also the discussion on Barad later in this chapter.

40 In addition, he identifies a number of social subsystems based upon the recursively used, and therefore structured or ‘codified’, processing of meaning that leads to functional differentiation between subsystems based upon a particular bivalent code and a medium. The economic subsystem, for example, has as a code payment/non-payment and uses as a medium, logically, money. Other by Luhmann identified subsystems are the political, the judicial, art, media, ecology, society, etc. In switching to these social systems of communication, Luhmann tries to move away from the Cartesian dualism by excluding the human and the material as a primary focus of analysis and by placing the agency, as such, on a different level altogether, on that of systems of communication. That said, it is hard to escape the impression that Luhmann, with his explicit attention to social systems of communication, still approaches the world mainly from a holistic, but nevertheless, humanistic perspective.
reproducing distinctions. Something that can be compared with a map: whatever map you use or make, whether it is a topographic map, a satellite image, or a street map: different distinctions show different aspects of the world depending on what the observer needs. To be able to make this claim Luhmann identifies two levels of observation. Luhmann separates first-order observations, where time plays no role for decision makers as everything is happening simultaneously and people are ‘in’ the moment, from second-order observations where the observer is able to actually reflect on an event. In reflecting on an event, a second-order observer also makes multiple distinctions on, for example, before and after, good and bad, etc.41

Radical constructivists share with Wittgenstein and Luhmann the concern over observers and their objects. It is a concern that also returns in other important concepts in the literature. In line with the iterative linguistic idea of meaning in use, the concept of a hermeneutic circle, for example, deals with the continuous theoretical and contextual enforced interpretation of texts by observers: that all knowledge is always already situated in other knowledge. Likewise, debates on agents and structures and their mutual interaction deal with the position of the individual (agent) in relation to society (structure) and that neither can be seen as separate from the other.42 If one accepts this epistemological argument than these concepts draw the attention towards the impossibility to separate facts and values.43 Or in other words, that those able to claim “facts” in effect engage in a power struggle (by claiming legitimacy and authority) over the shared knowledge (e.g. values) that defines, on the one hand, what is considered to be “normal”, and on the other hand, what is considered to be outside of language and thus “real”.

This is the main argument made by radical constructivists in IR against critical realism, especially with the latter’s focus on rationality and the scientific method.44 Kratochwil argues that the epistemological argument about the constant interpretation of the senses should not be solved by putting ontology firsts, as critical realist do by starting from the material impact of science, but instead should be bracketed by ‘pragmatically’ focusing on methodology and methods to ‘provid[e] the necessary warrants’ against claims of voluntarity and ‘anything goes’ arguments.45 More specific, Kratochwil argues for a pragmatic social objectivity that is achieved through

42 Giddens 1986; Carlsnaes 1992; Carlsnaes 2008; Doty 1997; Wendt 1987; Dessler 1989; Sewell 1992; Wight 1999. Trying to find a way to go beyond this chicken-and-egg situation asks for a mediation of two inherently opposing positions that has been, and still is, a core theoretical challenge within IR and the wider social sciences. For possible alternatives, see, for example, Pierre Bourdieu’s concept of ‘Habitus’ or George H. Mead’s distinction between the ’I’ and the ’Me.’
43 Foucault 1977, 27.
44 Kratochwil 2000. See also: Der Derian and Shapiro 1989; Ashley and Walker 1990; Der Derian 2009; Onuf 2013.
45 Kratochwil 2000, 73. See Herborth 2012 on the ‘quest for certainty’.
a consensus ‘courtroom ethics’ (e.g. a consensus theory of truth).\textsuperscript{46} When all matter and social relations are interpreted through language and social knowledge, the only ‘truth’ available is a social one, and this implies that meaning-giving structures can only be achieved by social agreement. Wight replies by posing the question why these scholars offer an alternative explanation of current phenomena in the first place, if not because they believe them – in whatever sense – to be “better”?\textsuperscript{47} In fact, it is not so much that radical constructivists reject the scientific logic Wight criticizes them to be following as well (they do indeed), but that they question, on a higher abstraction level, the scientific logic itself as being one of many logics or discourse that can be used to find the “truth”.\textsuperscript{48} In other words, these scholars take fault with the meaning of the term “better” as this is inherently a value judgement.\textsuperscript{49} For these scholars, what should be asked instead is the critical question of better for who? Whose interests are aided by proclaiming something as “better” or “progress”?\textsuperscript{50}

\subsection*{7.2.4 Social Essentialism}

There are two popular arguments against the post-positivist approaches discussed so far. Both of these are strongly influenced by decontextualized quotations from, on the one hand, the early Wittgenstein who once wrote that ‘[t]he limits of my language mean the limits of my world’ and, on the other, Derrida’s famous ‘[t]here is no outside-text’.\textsuperscript{51} The first argument is made by positivists who misread the positions above and succumb to a ‘fear of relativism’.\textsuperscript{52} This is the ‘anything goes’ or voluntarism argument, which states that if all that exists is based on language and communication, why not just speak and think differently to change the world? In a sense, this argument is correct. Language and knowledge are pliable to an extent that matter is not. However, the above already indicates the force and stability of social practices, thought patterns (discourses) and communicative structures: while they change, people constantly and with each iteration work hard to preserve and stabilize them. Moreover, as discussed below, people act on them and in doing so materialize the social structures and norms.

A second argument represents the basic assumption behind a relatively new strand of literature called ‘new materialism’. It is an assumption that builds on claims like Patomäki and Wight’s argument that ‘for positivists, sense-experience is real; for post-positivists, discourses or intersubjectivity is real.’\textsuperscript{53} The problem for many new

\begin{itemize}
\item \textsuperscript{46} Kratochwil 2000; Kratochwil 2007b; Kratochwil 2007a.
\item \textsuperscript{47} Wight 2007a. See also Wight 2000; or more abstract: Suganami 2013.
\item \textsuperscript{48} Compare with Wittgenstein’s Language games. God, or religion is another logic.
\item \textsuperscript{49} See the excellent discussion in Jackson 2008, 136–142.
\item \textsuperscript{50} If placed in discussions about energy security and scarcity, or any other political-economic system behind natural resources, this implies white middle-aged Western males.
\item \textsuperscript{51} Wittgenstein 1922, para. 5.6; Derrida 1976, 158–159.
\item \textsuperscript{52} Jackson 2012.
\item \textsuperscript{53} Patomäki and Wight 2000, 218.
\end{itemize}
materialist is that if this is the case, if language is all that we can study, as for example argued in Seutization Theory, would that not imply that one has simply shifted a representation of the world in positivism towards a representation of linguistic structures instead?\textsuperscript{54} As Dolphijn & Tuin quote De Landa:

\[\ldots\] general categories do not refer to anything in the real world and \[\ldots\] to believe they do (i.e. to reify them) leads directly to essentialism. Social constructivism is supposed to be an antidote to this, in the sense that by showing that general categories are mere stereotypes it blocks the move towards their reification. But by coupling the idea that perception is intrinsically linguistic with the ontological assumption that only the contents of experience really exist, this position leads directly to a form of social essentialism.\textsuperscript{55}

Following a similar line of thought, Barad argues:

Language has been granted too much power. The linguistic turn, the semiotic turn, the interpretative turn, the cultural turn: it seems that at every turn lately every “thing” – even materiality – is turned into a matter of language or some other form of cultural representation.\textsuperscript{56}

Where De Landa and Barad focus on the ontological and epistemological preposition of language over materiality in these quotes, Latour, one of the driving scholars behind Actor-Network Theory (ANT), questions the use of the category of the “social” as distinct from the natural. For Latour, what happens when people designate something as social (as a social fact/phenomenon), is that they are diverting attention away from the process of actual association between the different elements of such a phenomenon.\textsuperscript{57} In other words, he focusses on the act of defining something as “social” and sees this as a form of politics that performs a closure of an on-going process of association between different elements that exist and originate in the space in-between humans (e.g. chapter 5.4 on speech act literature).

Both De Landa, Barad and Latour find fault with many post-positivists who, according to them, have simply shifted their representational position within the

\textsuperscript{54} Wight 2007a; as well as Jackson 2008; Jackson 2010.
\textsuperscript{55} Dolphijn and Tuin 2012, 98 quote De Landa’s 2006 book A New Philosophy of Society (p45–46) [original Emphasis]; Compare with Lemke 2002, 61 who argues that scholars ’should prevent […] a very serious flaw that dominates much contemporary critique: the “essentialization of the critique of essentialism.” What do I mean by this? When social and political scientists increasingly claim the importance of categories like “invention,” “fiction,” and “construction” for their work, they often double the theoretical attitude they initially set out to criticize: they hold that the “poststructuralist” or “anti-essentialist” stance they adopt does signal a “right” or “true” knowledge.
\textsuperscript{56} Barad 2007, 132; Barad 2003, 801.
\textsuperscript{57} Latour 2005b.
material-social dichotomy from the material towards the social. The core of their critique focuses on the idea that post-positivist scholars still uphold a Cartesian dualistic worldview, based on the observer who a priori assumes that language and the world are separated to begin with. It is only in a Cartesian dualism where mind and body can represent each other that the above critique makes sense. This, however, might be phrased too strongly. On the one hand, yes, it is easy to over essentialize language in post-positivist theories as highlighted by the quotes of Wittgenstein and Derrida above. Then again, most of the post-positivist work, including the work of Wittgenstein and Luhmann, acknowledges objects and materiality. As Hekman (herself working on materiality) reflects on Wittgenstein: ‘His discussion of language games as activities, of general facts of nature, form of life, and many other concepts suggests an interactive understanding of the relationship between the discursive and the material.’ Similarly, Derrida’s quote on text above, which is often combined with the understanding that all knowledge is ‘always already’ situated in other knowledge, is quite easily reinterpreted in a broader sense of ‘ongoing historicity.’ A narrow theoretical focus on linguistic structures therefore does not automatically imply that scholars claim that language is all that exist.

In short, it can be argued that the Cartesian dualism that separates matter and discourse permeates much of contemporary IR research. This section shows, however, that by starting from a dualist worldview tensions arise on both a meta-philosophical, theoretical and methodological level; especially for those who accept the epistemological insight that we can only know of things through discourse and other linguistic structures. For these post-positivist scholars, all that we know are discourses and the concepts that gain meaning in use by their differentiation from other concepts. These differences have a history that is based on previous understandings and distinctions. This makes it impossible to see or experience something new without first being structured by the rules of society hidden in an intersubjective understanding of the world and the linguistic structures that enable (or inhibit) possible routes of thought and action. Each of these understandings and distinctions is based on a judgement made by an observer on an object of study. This translates facts into shared distinctions, which are based on shared values of judgement. It is here that we see a difference between critical realists, for whom the better argument is always based on something because we can act on things (we cannot know the world,

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58 Jackson 2008; Jackson 2010.
59 Hekman 2010, 32.
61 See also Hekman 2010, 30–31 or the discussion in Lundborg and Vaughan-Williams 2014. For example, Luhmann 1995 of course starts from three systems, only one of which is the social system of communication. Similarly, Cheah 2008 discusses the nondialectical materialism that is present in Derrida’s focus on ‘text’.
but it exist), and radical constructivists who instead argue for a pragmatic argument (we agree on the world). Nevertheless, both share that the material world exists and that it cannot be understood independently of shared social understandings.

7.3 Leaving Humans Behind

7.3.1 New Materialism

Irrespective the broader ontological context of post-positivist studies, the focus on language, knowledge and social structures does limit the research parameters of post-positivism. If only for the pragmatic reason that it is hard to study everything. The subsequent inattention to matter is something that sits ill with a rising number of scholars in IR and the wider social sciences, driven in part by the complexity and (perceived) urgency to understand phenomena like climate change, GMO’s and nanotechnology. This discomfort is often illustrated with an argument in line with Pickering’s claim that one way or the other the world actively resists and accommodates human activity. Whatever meaning we attach to the world, the world is believed to be able to act of itself and on itself, and is therefore capable of surprising humans by altering the conditions of possibility. What these scholars question is the predominantly human centered approach in current social theories, from both positivist and post-positivist theoretical perspectives. As an alternative, they argue in favor of a post-humanist meta-theory: a meta-theory that shifts the scholarly focus away from the overwhelming attention on human agency towards an entangled material and human agency (hence not anti-humanist). In this way, these authors, instead of entering the matter-social discussion from the side by way of a post-positivist focus on shared language, a positivist focus on representation or a focus on materialism, tackle the debate head on by questioning how matter and the social inter-, some would say, intra-act. As Dolphijn & Van der Tuin describe this intra-action: ‘the material and the discursive are only taken apart in the authoritative gesture of the scholar or by the common-sensical thinker; while in the event, in life itself, the two seeming layers are by all means indiscernible.’

New Materialist scholars thus argue that what is missing is an approach that tries ‘to provide an account of how both materiality and language matter.’ What is missing is what Jackson elsewhere has called a ‘monist’ approach, by which he refers to a way

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63 Coole and Frost 2010a, 27.
64 For the term intra-action, see the explanation of Barad below in chapter 7.5.
65 Dolphijn and Tuin 2012, 92–93. Likewise, Latour states that ‘There exists no relation whatsoever between ‘the material’ and ‘the social world’, because it is this very division which is a complete artefact.’ Latour 2005b, 75–76.
66 Aradau 2010, 497.
of thinking that studies the practices that create both thought and things. A key concept in such a monist approach is entanglement, which states that the mind – body, society – nature, matter – social, and object – subject distinctions are all posterior distinctions made by human observers while in reality the world itself is not as clear-cut. The next sections will therefore build upon new materialist insights to offer an entangled material-discursive ontology instead of a dualist material and discursive ontology. An ontology that still builds on important post-positivist epistemological insights on the importance of linguistic structures, but simultaneously incorporates a constantly changing materiality. This section, in particular, will introduce the shared premises of new materialism, discuss materiality itself in terms of what it is and how it is analyzed, and will introduce Butler’s ideas on performativity as a general approach to mitigate the dialectic understanding of matter and discourse.

The question of how to approach an entangled and active materiality is studied by an agglomeration of scholars working from a range of different disciplines, including philosophy, feminist studies, geography, Science and Technology Studies (STS), performance studies, history and IR. For convenience sake, these are all branded as ‘new materialist’ even though none of the scholars seems to support this label. As broad as the underlying disciplines are, so wide ranging are the perspectives on how to answer the question posted above. Below this chapter’s main influences are Latour and other STS scholars working on Actor-Network Theory, Harman and Bryant on Object-Oriented Philosophy, and Bennett and Barad on the phenomena of entangled agency and the ethics behind materiality.

While these theories differ in their ontology and approach this entanglement from very different angles, these authors do share a range of understandings. First, they share a certain understanding of the non-human world “out there”. This understanding is severely influenced by the natural sciences, in particular, by the insights gained from particle physics, chaos theory and complex systems theories. They take from particle physics the instability of objects, as all objects consist of smaller entities, which in turn depend on even smaller entities, all the way to sub-atomic particles and smaller, and the idea that all objects are in a constant state of flux in response to the movement of like entities. In addition, these theories take their lead from chaos and complexity theories (most famous for their role in climate change analyses and the so-called butterfly effect), which depict the world as a constant dynamic process of ‘an intricate filigree of relationships’ that is described as self-organizing (with both

67 Jackson 2010.
69 Barad 2007.
70 Whatmore 2006 talks about ‘material re-turns’ as ‘new materialism’ for her objectifies the issues at hand.
71 The phenomenological ontology of Barad will be discussed in chapter 7.5.
72 Coole and Frost 2010a, 11–14.
positive/reinforcing and negative/adapting feedback mechanisms), intersectional, multi-scalar and, in the case of chaos theory, as non-linear. In other words, new materialism moves past “fixed” objects to constantly interacting, shifting and mobile objects and their relative durability.

Second, they all share a move from epistemology to ontology, not so much to the question of what is but instead to the question of how things become. The focus lies not on matter as such, but on how things materialize. New materialists approach this by assuming that materialization takes place through self-organization, in a pluri-potential, multi-scalar and multi-dimensional form of immanent and virtual agency. Third, this ‘more-than-human mode of enquiry’ rejects any totalizing ‘overly theoretical, formal approaches’. For new materialist everything is local. Hence, they not only reject radical constructivist theories, with their focus on social structures, norms and rules, but also deterministic positivist research, like statistical analyses, where everything is subsumed under the logics of theory and methodology.

Fourth, to study such an ontology these scholars shift their epistemology from a focus on discourse and material objects towards practices and relational affects in order to highlight the relationality between more-than-human entities. They position themselves thus in-between discourse and material objects by studying the practices and relations that enable the existence of both. To repeat, these shifts together do not mean that new materialism scholars reject the main critique of constructivists on positivist materialist studies. On the contrary, fifth, they build on it in what Whatmore calls the shift from a ‘politics of identity to a politics of knowledge’ and Mol introduced as ‘ontological politics’, which she describes by arguing that:

> If the term ‘ontology’ is combined with that of ‘politics’ then this suggests that the conditions of possibility are not given. That reality does not precede the mundane practices in which we interact with it, but is rather shaped within these practices. So the term politics works to underline this active mode, this process of shaping, and the fact that its character is both open and contested.

This fifth move draws attention to the idea that in a more-than-human world the question on what something is and who exactly acts (and through what) become a

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73 Ibid.
74 Hekman 2010, 68.
75 Coole 2013.
76 Whatmore 2006; Coole 2013, 454.
77 Coole 2013, 454.
78 Whatmore 2006.
79 Walters 2014, 103; Coole and Frost 2010a, 26; Bourne 2012, 155.
80 Whatmore 2006, 604.
81 Mol 1999, 75.
very political question with strong ethical connotations as they touch upon questions of responsibility and accountability. Every explanation (knowledge) of an event becomes a closure that fixates particular material and social subjectivities, structures and power relations, and hence is debatable.

New materialism is not the only theoretical work that derives from these insights an understanding of the world as an open and dynamic system devoid of inert objects. For example, the chapter on security already described risk and resilience with their sense of vulnerability, just as the chapter on scarcity discussed ecological thresholds. In addition, much of the literature on natural resources has shifted towards system approaches (e.g. energy systems or food systems) based on infrastructure, logistics or (political) ecological understandings of anthropocentrism (the geological term for the age of man). In a time when humankind is dominating its environment, many of the theories in question reflect upon its exposure by highlighting that humans are a part, but only a part of the total system. Dillon & Reid describe this post-human shift as a shift in understanding from a world that is complicated into a world that is complex: where complicated worlds can be ‘reduced’ and ‘simplified’, complex worlds can only be ‘embraced’ and ‘orchestrated’. In such a complex relational perspective, agency and causality are dispersed, mediated and no longer as predictable as once imagined.

### 7.3.2 When Matter Matters

Before discussing the insights of new materialism, it is useful to take a closer look at what we mean by matter or the material. Not because it will miraculously solve these longstanding debates but, as Dolphijn & Van der Tuin make clear above, because the nature-culture dualism itself is something that is formed in and through people’s everyday use. Consequently, we should be aware of how the use of these terms like materiality actually constitutes such differences. This is taken up by following four different inroads into the meaning of matter, ranging from a negative definition, via a substantive meaning of matter, towards an interpretation of matter as a verb and finally a brief reflection on the instrumentalist and deterministic approaches to artefacts.

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82 Dillon and Reid 2001, 46–47.

83 Bryant 2014, 4. For Massumi there is an important difference between systems and processes: where a system is self-referential for its existence and only varies to adapt, processes do not feedback on themselves but produce variation first. Processes are ‘difference-referenced’ whereas systems are ‘self-referenced’. See Massumi 2009, 168–169. Within new materialism, this separation is often convoluted.

84 See Dolphijn and Tuin 2012, 92–93 above; as well as Barad 2003, 828. See also Woolgar 2002, 269 who states that: ‘Yet in our explication of this duality we remain prisoners of the language conventions that both support and derive from just this duality. So the duality endures.’
First, an easy way to circumvent any discussion on the precise meaning of matter is to turn the question around and define the material by claiming that it is everything non-social. But then, is there anything like that? And what precisely is meant by the social? Dolwick, a maritime archaeologist, clearly struggled with similar questions on the relations between matter (in particular human constructed artefacts) and the social, and approached them from sociology. In his overview of social theories, Dolwick starts with a brief description of three broad, inherently limited and heavily contested categories of ‘the social’. The first and broadest definition describes the social as associations between relational objects (e.g. ANT’s heterogeneous networks of relations; Pickering’s mangles of practice; Barad’s materialdiscursive entanglements). More limited is the definition of the social seen purely as ‘humans-among-themselves’, thus entering the Cartesian dualism with its agent-structure debates and focus on the creation of meaning. Lastly, and most narrow, is a definition focused on social structures or social facts. In this definition, the social is bereft of agency (a position most often taken in empirical post-positivist IR research). What becomes clear from Dolwick’s overview is that the distinction is not natural and that a negative definition does not work. The different explanations of the social indicate that the observer ultimately defines what is social and what is not social. It also highlights that only an interpretation of the social in terms of associations allows new materialist to escape this fallacy.

Secondly, a similar discussion on the concept of matter leads to a differentiation between a substantive definition of matter and a socially engaged value judgment of what matters. The substantive definition of matter builds upon a difference between the interchangeably used terms matter, the material, materiality and materialization. Matter can be defined as something that occupies space and consists out of mass (atoms, particles, energy). The material is a term used to describe something made out of matter, when matter is reworked in different substances or elements. In turn, the verb materialization describes the process of turning, shaping, enacting or creating material objects from social practices and ideas. Lastly, the concept of materiality stands for the theoretical and ontological position that claims that matter exists outside of human sensory observation. These different aspects of matter clearly show the complexity of matter, one that is further confused by the shifting links between materiality and, respectively, foundationalism (e.g., unquestioned basic beliefs that justify other beliefs, whether defined as brute material facts or social facts), essentialism
(that all entities, social or material, contain a specific set of attributes) or naturalism (that everything can be explained in terms of natural causes and laws), which are all part of the philosophy of materialism but are frequently used on their own.87

Third, in addition to these meanings of matter, what matters as well is an understanding of mattering: the value judgment that some things are more important than other things. Of course, mattering can be explained anthropocentrically, when for instance things matter because people desire them (scarce resources) or because they give cause for concern and are undesired (security). However, such a social explanation only tells half of the story. It neglects whether the material matters because it cannot be influenced as it exists independently and lies outside of “us humans” (a Cartesian argument) or whether it matters because the material is more durable, because it is too hard to change (a relational or relative argument). New materialist combine exactly these two points, for example, when Ahmed describes matter by arguing that “[w]hat matters is itself an effect of proximities: we are touched by what comes near, just as what comes near is affected by directions we have already taken.”88 These scholars thus study those things that matter based on a combination of the matter outside of humans and how it matters relationally for the object in question. How it inhibits and structures action, threatens ones existence or contains desirable qualities worth obtaining. More than that, with the attention to nearness new materialist scholars argue in line with Deleuze that what matters “is always a practical problem, never a universal problem mattering for everybody.”89 For new materialists everything is local, always.

A last aspect worth mentioning in this respect is the role of technology and artefacts as the materialized bridge between the social and matter. As a bridge, Winner described technology or artefacts already in the 1980s as being “by their very nature political in a specific way.”90 Winner was one of the first to write about the active politics of artefacts (including infrastructure), which he described in two ways: either artefacts matter because of the explicit political effects of technology, or artefacts matter due to the particular ingrained political organization that is necessary for the technology in question to come into existence. Winner highlighted the explicit political effects of technology with the example of the bridges to Long Island, New York.91 Designed at a specific height and width these bridges prevented busses to

87 Also, materialism is not identical to physicalism, the latter also includes non-matter (e.g. gravity). Elsewhere, Harman 2009, 74 & 141–143 notes that Latour sees materialism actually as a covert form of idealism because it shifts the attention away from actors and agency towards the physical world (instead of the social) to explain everything. See also Wendt 2005.
88 Ahmed 2010, 234.
89 Stengers 2010, 28.
90 Winner 1980, 124, 129.
91 Ibid., 123–126.
reach the island. With personal automobile ownership and use prevalent under whites, these bridges, through their design in that socio-economic context, prevented non-whites from reaching the island. They were designed with a political effect in mind. Other examples discussed by Winner include the neglected access to transport and other facilities for people with a disability or the deliberate construction of labor replacing machinery to limit the influence of labor unions. As he summarizes:

Consciously or not, deliberately or inadvertently, societies choose structures for technologies that influence how people are going to work, communicate, travel, consume, and so forth over a very long time.92

While these examples rest on a (conscious) political choice at the initiation of the technology, Winner explains the ingrained political organization of artifacts by highlighting the pre-required political and social relations necessary for the technology to exist in the first place. He explains, for example, how nuclear energy requires a knowledgeable and capital-intensive elite as well as an administrative hierarchy to be able to build and steer a nuclear infrastructure in the first place. Of course, once constructed these elites are reinforced in their position due to the existence of the infrastructure itself.

Contra Winner’s argument, technology today is mainly discussed in non-political terms as either substantive (deterministic) or instrumental.93 Of these two perspectives, Bourne argues that the instrumental view on technology ‘predominate[s]’ in western political and social thought’ where it is seen as a ‘neutral tool.’94 As a tool, its use and social impact is determined not by the technology itself, but by the people that use it within their social relations. A deterministic perspective disagrees with this instrumentality and views technology as the determining independent factor that shapes social relations and sets the context of human action.95 On its own a deterministic argument is clearly overstated, as technology is designed and thus political. However, for McCarthy a small nuance makes technological determinism more viable than instrumentalism because for him ‘[i]t is not that technology develops outside of human agency, but that it develops outside of some humans’ agencies.’96 What McCarthy argues is that technological determinism exist the moment one looks at the relations between societies spread over time and space.97 The European use of gunpowder and navigation techniques are an obvious example, just as drone warfare

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92 Ibid., 127.
93 McCarthy 2013; Bourne 2012.
94 Bourne 2012, 142; McCarthy 2013, 473–474.
95 Bourne 2012, 143; McCarthy 2013, 472–473.
96 McCarthy 2013, 476.
97 Ibid., 478–479, 481.
is both an American political choice on the use of an instrumental technique and a determining factor in the life of many in Central Asia.

### 7.3.3 Towards the Performativity of New Materialism

The deterministic perspective is not only viable based on the plain technological dominance of one group over another. McCarthy also discusses the social and institutional norms that come with such a material dominance and discusses these as a major source of power that determine the life of those distanced from the technological innovation and its decision-making process itself.\(^9^8\) With gunpowder and navigation came perceptions and norms on mathematics, accounting and investment, just as the American drones are accompanied with rules of proper non-terrorist behavior and (debatable) ideas of justice and security.

It is possible to return from the politics of technology to the politics of matter with the help of Butler, who makes a similar claim as McCarthy on a very individual and bodily level when she writes:

> Of course, persons use technological instruments, but instruments surely also use persons (position them, endow them with perspective, establish the trajectory of their action); they frame and form anyone who enters into the visual or audible field, and, accordingly, those who do not.\(^9^9\)

In a way, both McCarthy and Butler highlight that it is not a neutral affair to describe technology in terms of determinism or instrumentalism. Any analysis starting from these positions becomes pre-structured and directs the focus of the scholar involved. Importantly, these pre-determined positions close off any potential analysis of the actual interaction of matter and social.\(^1^0^0\) This is a similar point to the general criticism of Barad on positivist and post-positivist studies, when she argues that ‘... the nature/culture dualism foreclose[s] the understanding of how “nature” and “culture” are formed …’ in the first place.\(^1^0^1\) In other words, for Barad the driving question is not so much whether the social or the material matter, in fact, not even whether the social and the material matter, but 'how matter comes to matter'.\(^1^0^2\)

This question opens the analysis to both sides of the mind-body dialectic. It studies how matter changes and sediments social understandings, but it also studies how language plays a role in making sense of matter. Simultaneously, it moves away from post-positivist understandings of de-construction and construction. For new

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\(^9^8\) Ibid., 488.

\(^9^9\) Butler 2009, xii. Also in Holmqvist 2013, 545.

\(^1^0^0\) Bourne 2012, 143.

\(^1^0^1\) Barad 2003, 828.

\(^1^0^2\) Barad 2003; Barad 2007. See also Latour 2004; Latour 2005b.
materialists the goal is not to deconstruct issues and open them to critique and reconstruction. Instead, they move the speech act literature back to its original starting point on acts (in line with the critique on Seuritization Theory in chapter 5.4). This understanding still includes speech acts, but opens them from explicit and exceptional speech acts to ordinary language use and the distinctions and delimitations implicit in speech. In addition, the act is extended to include non-speech acts like human behavior, bodily actions and cause and effect relationships. The concept developed by Butler to describe this focus on ‘how matter comes to matter’ is performativity.

Importantly, in Butler’s original introduction to performativity in 1993, the concept is not taken to include non-linguistic acts. For Butler, performativity ‘must be understood not as a singular or deliberate “act,” but, rather, as the reiterative and citational practice by which discourse produces the effects that it names.’ The act that Butler describes is one based on discourse that produces an ontological effect as it materializes and brings into reality the social effects that follow from the discursive delimitations behind the repetition and reiteration of previous practices; it ‘decides, as it were, what will and will not be the stuff of the object to which we then refer.’

Performativity is the 'process of materialization that stabilizes over time to produce the effect of boundary, fixity, and surface we call matter.' For Butler, performativity highlights what discourse does to the non-discursive. At the same time, its constant reiteration unlocks the potential failure that is inherent to performativity by highlighting a contextualized process where things only exist in the moment. Performativity is inherently incomplete, even when materialized or codified (in contrast to theoretical explanations of society). Part of this incompleteness stems from the materiality itself, as bodies and matter resist the ascription of discourse. A body is never shaped by discourse, but it is normalized by it and forms itself in line with its historical social and material evolution. This productive normalization is something Butler takes from Foucault and which leads her to define materiality as ‘designat[ing] a certain effect of power or, rather, is power in its formative or constituting effects.’

Where Butler remains focused on discourse and the materialization it initiates, others, including Latour and his colleagues from Actor-Network Theory as well as...
Barad, broaden this idea of performativity. These scholars try to move away from a human centered approach by opening up their ontology to the actions of matter itself. They do so by building on the relationality that is inherent in Butler’s (and Foucault’s) performativity. Contrary to Butler, however, these authors push the argument by officially moving away from a preference of discourse to the relations that shape objects. These relations include the relation between humans, between minds and bodies (discourse-non-discursive), but also the interactions or cause-effect relationships between material “nodes” (who themselves exist out of relations). In allowing for interaction outside discourse, but in addition to discourse, these new materialists claim to move beyond Butler’s understanding of performativity.

An interesting performative example that details such a relational understanding is Bennett’s analysis of the August 2003 Northeast American electricity blackout.\(^\text{111}\) Her discussion of this massive black-out that affected over 50 million people highlights not only a – quite literal – relational analysis, but also discusses the manageability of such assemblages and the ingrained ethical questions that such an approach calls for. Bennet herself describes the blackout as ‘the end point of a cascade—of voltage collapses, self-protective withdrawals from the grid, and human decisions and omissions.’\(^\text{112}\) While she concludes that the investigators tasked with studying the blackout had no idea what stopped the cascade,\(^\text{113}\) she analyses in detail their conclusions on the accumulation of (unrelated) factors that contributed to it. As Bennett summarizes the official report:

The U.S.-Canada Task Force report was more confident about how the cascade began, insisting that there were a variety of agential loci. These include electricity, with its internal differentiation into “active” and “reactive” power (…); the power plants, which are understaffed by humans but overprotective in their mechanisms; the wires of transmission lines, which tolerate only so much heat before they refuse to transmit the electron flow; the brush fire in Ohio underneath a transmission line; FirstEnergy and other energy-trading corporations, who, by legal and illegal means, had been milking the grid without maintaining its infrastructure; consumers, whose demand for electricity is encouraged to grow without concern for consequences; and the Federal Energy Regulatory Commission, whose Energy Policy Act of 1992 deregulated the grid, separated the generation of electricity from its transmission and distribution, and advanced the privatization of electricity.\(^\text{114}\)

\(^{111}\) Bennett 2005.
\(^{112}\) Ibid., 448.
\(^{113}\) Thereby acknowledging Grove’s point on the incapability of network inspired analyses to analyse creativity, or in this case non-existing agentic traces. See Grove 2014.
\(^{114}\) Bennett 2005, 449.
This assemblage of factors led to a situation where the stress on the grid increased in a matter of minutes and kept increasing with each of the power plants that withdrew from the grid, as each of them further increased the strain and in turn set the alarms of other power plants. In total, this cascade led more than one hundred power plants to initiate their automatic safety and shutdown procedures.

Most interesting for Bennett about this cascade is the fact that it is impossible to account it to human agency alone. This is not to say that humans played no role at all. In fact, Bennett is quite adamant that humans most definitely played a role in the blackout through their capitalist behavior in the – in hindsight – faulty regulated and liberalized electricity markets. However, in addition to the automatic safety systems, Bennett also highlights the agentic capacity of the electricity flow itself; a flow which spontaneously shifted its direction after several transmission lines broke down and thereby strained the grid in ways it had not experienced before.\textsuperscript{115} For Bennett such a distributed agency calls for an equally distributed accountability, and hence for an ethics that is ‘detached from moralism’ and a ‘politics of blame’ as both of these are human focused.\textsuperscript{116} In fact, Bennett argues that responsibility and accountability in events like the blackout should be approached in terms of a choice. Pending the political or social need, it becomes a judgement to either acknowledge a distributed accountability or hold only humans accountable.

In sum, in the rejection of a sole focus on language and discourse, new materialist scholars are trying to study the actual relationship between “mind” and “body”, by moving away from a human centered analysis and asking how matter comes to matter. In their post-human approach, these scholars use a local and relational ontology that allows them to study the materialization of relationships between humans, matter, discourse and so forth. They study the becoming or enactment of new sets of relationships, by taking a performative approach that looks at these relationships irrespective whether their origin is social or material. In other words, they place the material side of the relationships on an equal footing with the discursive, as in Bennett’s example or in the technological determinism of McCarthy and Winner. Interestingly, they still separate the material and social analytically, and they still seem unable to study these ontological politics without referring to knowledge. In addition, as discussed below, while new materialism has the tools to describe and observe new relationships from both “sides” of the material-discursive assemblage, that is all they can do. They cannot explain where these new relationships come from without again needing to discuss observation before being able to describe materialization.

\textsuperscript{115} Ibid., 451.
\textsuperscript{116} Ibid., 464.
7.4 The Virtuality of Relations

7.4.1 A Relational Ontology of Actor-Networks

Three elements of Bennett’s example touch upon the question where change comes from: the relationality of the different interacting nodes of the electricity grid, the surprise of unintended material effects and the ethical impact of deciding on the accountability of such a relationality. This first section will introduce a Latourian version of Actor-Network Theory to further study the relationality of new materialism. The second section discusses the critique that is levied against ANT in relation to the source of change and the last section will translate this back to the broader new materialist literature by focusing on the unintended material effects. Chapter 7.5 will continue with an ethical reflection on new materialism by discussing material-discursive relations in terms of observation practices.

Actor-Network Theory stems from the work of Latour, Law, Callon and Mol within Science and Technology Studies (STS). ANT is arguably the most popular of the new materialist approaches within the social sciences, due to its highly empirical framework around a network metaphor that highlights the complexity of the world as it studies the relations and traces between nodes, while offering explanations for the network’s durability and a warning for its strong inherent political effects. The core reason behind ANT’s rejection of a sole focus on language rests upon the broadly shared observation that the material is vital as an ordering principle for society. In other words, that it is the material that helps order societies. Latour gives the example of a group of chimpanzees that is constantly touching, de-fleaing and performing other niceties, not because they like it, but because they lack the use of materials and, as a result, are constantly in need to (re)constitute their ‘decaying’ society and its hierarchical relations.

The sedimentation of social effects in durable material artefacts is not unique to ANT. Miller, working from an (historic) anthropologic orientation on the theory of Material Culture, combines precisely this insight with, what he calls, an ‘humility of things’ and what Latour calls ‘black boxing’, namely the argument that artefacts constantly shift in and out of focus and that the most unobserved artefact is, in fact, the one that influences humans the most. However, before things can shift in and


118 Latour 2005b, 70, 198. See also Law 1992, 3 on ‘material durability’; or Pels, Hetherington, and Vandenberghe 2002, 11 who claim that: ‘Objects need symbolic framings, storylines and human spokespersons in order to acquire social lives; social relationships and practices in turn need to be materially grounded in order to gain temporal and spatial endurance’.

119 Miller 2005, 2–8, esp. 3. Material Culture is particularly interested in the relation between the material and the anti-material, for example, when it comes to religion, or, more recently, the current economic society based upon consumption.
out of focus, Miller claims that these objects (and subjects) should have gone through a process of ‘objectification’. This is based upon Hegel’s insight that, in the words of Miller, ‘[…] everything that we are and do arises out of the reflection upon ourselves given by the mirror image of the process by which we create form and are created by this same process’. In other words, he argues that humans can only know themselves when they look in the ‘material mirror’ of ‘the historical world created by those who lived before us’. A mirror that comes to us in the form of material culture. For Miller, historical ideas and intentions (social agency) are sedimented through an objectification in the material, after which the “material object” shifts in and out of focus, and, through its connections with other objects is able to extend a limited agency of its own. While Latour agrees with Miller that the social is inscribed into the material and that ideas need materialization, he questions the assumption of Material Culture that only humans can be agents. From an ANT perspective ‘objects, in this case, would be simply connected to one another so as to form a homogeneous layer, a configuration that is even less likely than one which imagines humans linked to one another by nothing else than social ties.’ Instead, he sees people witnessing a wide range of hybrid quasi-objects – objects both material, social, human and non-human – doing things that are often overlooked and fluctuating depending on the phenomena in question.

This realization, that scholars will never really know ‘who or what’ is acting if they do not first question this explicitly, is the basic premise of Actor-Network Theory. Latour argues in this respect that:

The task of defining and ordering the social should be left to the actors themselves, not taken up by the analyst. This is why, to regain some sense

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120 Latour 2005b.
121 Miller 2005, 4.
122 Ibid., 5.
123 Ibid., 17–18. This material culture perspective questions the bivalent logic of reification (the material framing of social relations) or fetishism (the symbolic framing of material objects) as it does both. See also Le Billon 2007, 176 on commodification versus fetishisation.
124 Latour 2005b, 84–85 [emphasis in original]. See also: Bourne 2012, 161.
125 Latour 2005b, 72 argues, for example, that ‘there might exist many metaphysical shades between full causality and sheer inexistence’. On page 84-85 he identifies four: historical materialism (a material infrastructure like Marx’s that determines social relations); a material world that ‘mirrors’ the social distinctions (Bourdieu and other more critical oriented theories); and the material as a stage for human interaction (instrumentalist perspective); and lastly, those who put a heterogeneously layer atop the material and social (Material Culture). Elsewhere Woolgar 2002, 265 claims that: ‘The relationship between the material and the social is thus a boundary problem’ is something to which Latour and the other authors behind ANT would object strongly, as it focusses on hybrid forms that picture a mix of two pure forms. Thus actually negating this sentence!
of order, the best solution is to trace connections between the controversies themselves rather than try to decide how to settle any given controversy.\footnote{127}

In order to trace the connections, ANT envisions (1) a relational network of nodes that exhibits heterogeneous and rhizomatic qualities.\footnote{128} Each of these nodes are agent-networks in themselves and made up out of subsequent nodes and relations, which in turn are networks of shifting associations, and so on. To be able to study these sets of actor-networks without any a priori assumptions on how the relations look like ANT (2) assumes them to be irreducible and flat.\footnote{129} All actor-networks are irreducible or different from any other actor-network. And because the nodes can never be explained by something larger (because then they would be vertically reducible), the ontology of these networks is flat in Whitehead’s sense that all entities have an identical (horizontal) ontological standing, which in practice means that the smallest atom can be as important as the largest set of human economic relations.\footnote{130}

While ANT talks about actor-networks, it does not envision these nodes as “actors”, but instead (3) prefers the post-human term ‘actants’. For ANT, the term “actor” is not only too human centered, but it also hides the real set of relations that make the action possible in the first place.\footnote{131} An actor never acts alone or, as Tuana describes it, ‘[a]gency in all these instances emerges out of such interactions; it is not antecedent to them.’\footnote{132} To get behind the figurehead of the actor and get to the action itself, ANT introduces the term actant, which ‘… are simply different ways to make actors do things’ irrespective whether they are social or material, human or non-human, micro or macro.\footnote{133} An actant does not need motivation, willpower or rationality (on which humans are differentiated from animals), it is neither object nor subject, instead an actant ‘is that which does something, has sufficient coherence to perform actions, produce effects, and alter situations.’\footnote{134} Like the overall network, each actant in turn is an assemblage of a range of associations in itself. These assemblages are constantly shifting, one moment closing old relations and the next entering into new ones. While ANT sees actants as irreducible and flat to begin with, it does allow for

\footnote{127} Latour 2005b, 23 [emphasis added].
\footnote{128} On rhizomatic networks see: Deleuze and Guattari 1987.
\footnote{129} Bourne 2012, 154. Of course, this goes both ways. While it might be perceived as more real, in fact all actants are real. They only differ in the number / strength of their associations, see Fine 2005, 96.
\footnote{130} Harman 2009, 773; Bourne 2012, 154. For a more critical discussion, see Fine 2005.
\footnote{131} Latour 2005b, 46.
\footnote{132} Tuana 2008, 9; Dolphijn and Tuin 2012, 54.
\footnote{133} Latour 2005b, 55. Bennett 2005, 446–447 discusses actants as both coherent entities (e.g. a tree) and forces (e.g. gravity or mineralization), depending on how they appear to us humans.
\footnote{134} Bennett 2004, 355. In general, Bennett refers to this with her concept of ‘thing-power’.
differences in power: the more associations an actant upholds, the stronger it can affect its surroundings and the more “real” it appears.  

However, an observer can only witness the effects and strength of an actant if (4) the actant accounts for itself by leaving a mark or trace upon another actor-network. Here ANT (5) differentiates between mediators and intermediaries. On the one hand, an intermediary is an actant who offers a highly predictable causal relation as it ‘transports meaning or force without transformation’. For example, writing a paper depends on many factors, most of which the author is not aware as these factors have withdrawn from sight and are black boxed. These intermediaries do not make a difference. That is, until they break down, as all heterogeneous networks inherently fail at some point. Then suddenly an unobserved object becomes a thing: the computer could break down due to a power surge, a software glitch or a corrupt hard drive; or the author could develop RSI as the result from a cheap office chair, etc. In each case, the “black box” of the intermediary normally working components (relata) are opened up and matters of fact become matters of concern. For ANT, all intermediaries can transform into mediators, which do ‘transform, translate, distort, and modify the meaning or the elements they are supposed to carry’. At that moment of translation from input to output, mediators leave traces. More important, ‘[t]hey make each other be’. However, mediators can only transform into intermediaries when they are transformed or translated by the effects of other mediators. Humans too, as actants (e.g. based upon both human and non-human relations), often use particular mediators (e.g. tools of observation) to get intermediaries “to talk”. ANT searches for these translations, as these, no matter how big or small, hint at the actual associations and agency that make up the (social) world.

In an early reflection on ANT, Law summarizes these traces into three different strategies. The first strategy deals with ordering through time with practices of inscription and sedimentation (durability). The second strategy deals with ordering through space by enabling action and communication at a distance (ANT’s ‘immutable mobiles’ – letters, ships, etc.). Third, Law discusses a strategy of translation based on practices of anticipation, an anticipation of future relations, which he primarily

136 Ibid., 39.
137 Latour 2004. Things are continuously (re)produced relata, a continuous ‘gathering’ of relations as fact or concern, while Latour describes objects as failed ‘things’, as taken-for-granted end-products of observation.
139 Dolwick 2009, 45 [emphasis in original].
140 Latour 2005b, 79.
141 Hence ‘flattening the social’ and ‘localizing the global’ – i.e. the social does not stand above the material, and the macro is not more important than the micro/local, thereby removing the level-of-analyses problem. See ibid., 165.
describes in terms of calculative practices (compare to chapters 5 and 8).\textsuperscript{142} For ANT, all these traces are material. Even knowledge is considered a collection of material traces in this perspective because ‘[i]t comes as talk, or conference presentations. Or it appears in papers, preprints or patents. Or again, it appears in the form of skills embodied in scientists and technicians...’\textsuperscript{143} Simultaneously, Latour enforces that all ANT scholarly work comes as a textual account of a set of relations of a heterogeneous network.\textsuperscript{144} Where ANT differs from other accounts in the social sciences, is, however, in the accuracy it provides by accepting a greater level of uncertainty:

an account which accepts to be ‘just a story’ is an account that has lost its main source of uncertainty: it does not fret any longer at being accurate, faithful, interesting, or objective. ... In a bad text only a handful of actors will be designated as the causes of all the others.\textsuperscript{145}

Latour refers here to the idea of capitalism. He does not deny that capitalism exists, but argues that one can only truly study it by tracing its local relations, which in this case means starting with the Wall Street trading rooms and household budgets decided on at kitchen tables.\textsuperscript{146}

In other words, for ANT scholars, the idea of society or social explanations like norms, social facts or a concept as scarcity do more harm than good because they close off an understanding of what is really going on. Latour is quite strong on this and criticizes social scientist, who, instead of providing ‘powerful explanations’, are partaking in a power play that freezes ‘the entities already mobilized to render asymmetries longer lasting.’\textsuperscript{147} Instead of closing off these asymmetries from their reality by proposing explanations that are always valid, Latour and ANT argue in favor of a better examination of the actual construction of social events while acknowledging that things can always fail.\textsuperscript{148} With everything made up of inherently fragile heterogeneous networks and their mediators, ‘the dichotomy between the real and the constructed is, like all dichotomies, a false one.’\textsuperscript{149} Instead, the question becomes how well things are constructed and performed.\textsuperscript{150}

\begin{footnotesize}
\begin{enumerate}
\item Law 1992, 6–7.
\item Ibid., 2.
\item Latour 2005b, 122–130.
\item Ibid., 127, 130.
\item Ibid., 178–179, 192. For similar arguments on security and the economy/market, see: Schouten 2014, 27; MacKenzie 2008; Caliskan and Callon 2010.
\item Latour 2005b, 5, 8, 23, 68, 85, 260.
\item Ibid., 249.
\item Hekman 2010, 110.
\item Mol 2002, 7; Hekman 2010, 110; Latour 2005b, 89–90.
\end{enumerate}
\end{footnotesize}
7.4.2 Towards Virtuality and Actuality

One of the most interesting and thorough arguments against this Latourian version of ANT is made by the philosopher Harman in his argument for an object-oriented-philosophy (OOP), which basically states that ANT is unable to explain the origin of change.\textsuperscript{151} By placing ANT in perspective with other post-humanist philosophers, Harman identifies a renewed attention to the classic problem of ‘isolation and interbleeding of individual things.’\textsuperscript{152} In particular, he questions Latour’s paradoxical claim of ‘action at a distance’: that actants are simultaneously irreducible to other actants, both large and small, but nonetheless able to act and affect each other. For Harman, to be irreducible is to have distance, while to affect something requires a sense of nearness, a connection of sorts.\textsuperscript{153} As described above, Latour and ANT offer translation (by mediators) and abstraction (black boxing) as an answer to this dilemma. According to Harman, however, such a networked position results in actants who are always public and cannot hide. It offers a ‘realism of relations’ that rejects any form of essence and consequentially prevents the actants from having closed qualities.\textsuperscript{154}

By denying actants any form of essence, ANT consequently faces ‘an infinite regress of actors’ as each network consists of actants, consisting of networks, consisting of actants, etc.\textsuperscript{155} In this respect, Fine questions the observational arbitrariness of the inclusions and exclusions of what counts as part of an heterogeneous network. If there is always a larger or smaller network, then the observer takes position when s/he decides to stop studying the rest of the network.\textsuperscript{156} In turn, for Harman this lack of closed qualities of actants means that ANT only studies actual states of affairs and that Latour is unable to account for change as he rejects any form of potentiality: all relations that can take place, do take place.\textsuperscript{157} Latour is unable to account for that moment when an actant’s ‘alliances shift’, because at that same moment ‘by definition the actor has changed.’\textsuperscript{158} One consequence of such an actuality of present actants is a tendency within ANT and other network approaches to favor those relations that can be observed and measured most easily and thereby offer the illusion of manageability.\textsuperscript{159} In line with this, Harman argues that Latour is unable to explain the reality of ‘buffered causation’; that not all relations are entered the moment that

\begin{itemize}
\item \textsuperscript{151} Harman 2009.
\item \textsuperscript{152} Ibid., 6, also 99–107.
\item \textsuperscript{153} Ibid., 34–35.
\item \textsuperscript{154} Ibid., 72 & 75.
\item \textsuperscript{155} Ibid., 106.
\item \textsuperscript{156} Fine 2005, 96. However, compare Bennett 2012, 228.
\item \textsuperscript{157} Harman 2009, 130–134.
\item \textsuperscript{158} Ibid., 105.
\item \textsuperscript{159} Grove 2011, 1–2, 6. Later on, Grove discusses the use of the network metaphor to analyze terrorist groups.
\end{itemize}
they can be made.\footnote{Harman 2009, 147.} Similarly, Harman finds Latour unable to differentiate between symmetrical and asymmetrical relations and to account for uni- or bidirectional relations. He argues that ANT theorizes all relations as two-sided and evenly matched, with nodes only differing in strength based on the number of associations.\footnote{Harman 2009, 147.}

To counter the infinite regress in ANT Harman proposes a perspective that builds on ‘an absolute distinction between the domestic relations that a thing needs to some extent in order to exist, and the external alliances that it does not need. But the actor itself cannot be identified with either.’\footnote{Ibid., 135.} When matter is depicted as something firm and hard, people do not refer to an essential characteristic of the object but to its relational qualities: something is hard or intelligent only in relation to that which is not. In Harman’s view, most of his points could be answered by taking Latour’s meta-physics of actor-networks and adding the distinction between internal relations and external relational qualities to the insight that actants are able to enter a relation through the core of a mediator.\footnote{Ibid., 145–146 To read his specific treatise: p151-228, in particular p207-211. Also p187: ‘The potential can only mean a potential for future relations, and the actual can only mean what is in and of itself actual apart from any relations’.}

The precise argumentation of Herman is dense and will not be reproduced here. Of interest here is the fact that in his more recent work Latour accepts Harman’s argument and steps away from his earlier claims of irreduction, that no actant is reducible to another, while admitting that ANT has no way to study trajectories.\footnote{Farías 2014, 28–29; Latour, Harman, and Erdelyi 2011.} To incorporate and allow for change and potentiality Latour offers his view of networks against a background of unarticulated plasma.\footnote{Latour 2005b, 244.} This plasma is the potentiality of the network that fills the empty spaces between the nodes and the connections. Farias criticizes this move in a similar fashion as Latour criticizes social sciences: in shifting to a base plasma of virtuality that is ‘interrupted’ by the actual relations that take effect, Latour creates an a priori asymmetry that only explains where change comes from and not how the virtual becomes actual.\footnote{Farías 2014, 28–29.} To solve this, Farias turns to Luhmann’s systems of communication, which he describes as irreducible par excellence and thus comparable to Latour’s actor-networks.\footnote{Ibid., 31.} What Farias likes in particular, is the self-referentiality of Luhmann’s systems and how they make sense of their own environment (their virtuality according to Farias) and subsequently differentiate themselves from that environment and make themselves actual. He sees

\footnote{Harman 2009, 147. However, Latour does mention overflow. See Latour 2005b, 166.}
\footnote{Harman 2009, 147.}
\footnote{Ibid., 135.}
\footnote{Ibid., 145–146 To read his specific treatise: p151-228, in particular p207-211. Also p187: ‘The potential can only mean a potential for future relations, and the actual can only mean what is in and of itself actual apart from any relations’.}
\footnote{Farías 2014, 28–29; Latour, Harman, and Erdelyi 2011.}
\footnote{Latour 2005b, 244.}
\footnote{Farías 2014, 28–29.}
\footnote{Ibid., 31.}
each node (actant) as a system of relations (actant-networks) that observes the other nodes (actant-networks) and differentiates itself from it.

In this respect, the philosopher Bryant makes differences the starting point of his object-oriented-ontology (OOO). What he proposes, in order to have 'a foundation for knowledge' in answer to the epistemic argument, is an ontic principle that states that 'there is no difference that does not make a difference' and 'to be is to make or produce differences.' If everything results from difference, if 'beings are and become through their differences', than, on the one hand, nothing can be traced back to a pure origin and, on the other hand, one has an ontological position that forces one into an epistemology where you can only be sure of your knowledge if you engage with the differences. Bryant argues that such an ontic but testable starting point, which is comparable to ANT, leads to a post-human (all beings differ), irreducible (because beings differ they are irreducible) and flat ontology (all beings differ, hence are on equal footing) where scholars have to trace translations (that relations are actively made) but need to be careful in providing 'hegemonic' explanations (that one difference explains all). Contrary to a Latourian ANT however, Bryant agrees with Harman on the problem of durability over time as he observes that 'objects persist through time while nonetheless undergoing change at the level of their qualities.' Like Harman, he separates the endogenous relations of an object from its exogenous relations. In contrast to Harmann, Bryant also looks at topologies of inter-ontic relations that set constraints on individual actants, irrespective their direct relations. With inter-ontic relations, Bryant refers to the observation that beings often share endogenous relations, independent of the actual relations between objects that make them be. These inter-ontic relations are forced upon objects by a larger topology, like gravity that creates a shared need for skeletons. He explains this by allowing for unilateral relations and by arguing that objects need to be able to act on other objects, but also need to be open to be acted on by others.

Together these assumptions mark the relational, but differences based objects that allow Bryant to account for a shift from virtuality to actuality and back – without separating them a priori as ANT does. For Bryant the virtual is limited to the space between the inter-ontic topology and the capacity to act or be acted upon. The virtual for Bryant needs to be activated through translation in order to actualize a new state of affairs that brings into being new, potentially unknown, types of effects, which are

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168 A focus on differences is shared by Derrida and Luhmann, some of the strongest post-positivists.
169 Bryant 2011, 271, 272.
170 Ibid., 272–273.
171 Bryant 2011.
172 Ibid., 279.
173 Ibid., 280–282.
174 Ibid., 282 [emphasis added].
already pre-structured by a broader topology. Change, for Bryant, stems from the idea that not all effects are always actualized nor that all actualizations bring new effects, but that the material conditions of possibility are pre-structured by the virtual and actual relations between actants and their topologies.

### 7.4.3 An Eventful Folding

In a less abstract form and without the discussion on where change comes from, this virtual ontology is more generally known in new materialism as the ‘vibrancy of matter’.¹⁷⁵

materiality is always something more than “mere” matter: an excess, force, vitality, relationality, or difference that renders matter active, self-creative, productive, unpredictable.¹⁷⁶

Neither mechanistic nor reducible, this vibrant materialism envisions a world of becoming.¹⁷⁷ In a relational ontology this points to the ‘uncertain exchanges between stabilized formations and mobile forces that subsist within and below them’.¹⁷⁸ This is something that a more traditional Cartesian understanding of matter would never be able to tackle. Matter in a Cartesian dualist world-view is, according to Coole, ‘sheer exteriority’ and as such ‘devoid of interiority or ontological depth. It is without qualities like color or smell … without dark recesses, crevices, or hollows … unaffected by time or negativity… It is inert stuff emptied of all immanent vitality.’¹⁷⁹

A Cartesian matter is observable in its causality as it ‘tends to determination; it gives itself up to calculation, precision, and spatizalization.’¹⁸⁰ Of course, by now it should be clear that matter is not Cartesian. Moreover, even though matter is durable and observable, matter and ‘things are not just simultaneously material and meaningful; they are also eventful.’¹⁸¹

New materialists interpret the event as that what interrupts the habits and routines that make up subjects as well as the withdrawal of objects from its active relations.¹⁸² An event is the break with habit. That what starts mattering, not because of any a priori socially provided interests but because ‘it gives to that something a power it does not generally possess: the power to cause us to think, feel and wonder, the power to have us wondering how practically to relate to it, how to pose relevant questions

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¹⁷⁵ Bennett 2010b.
¹⁷⁶ Coole and Frost 2010a, 9.
¹⁷⁷ Connolly 2010.
¹⁷⁸ Ibid., 179.
¹⁷⁹ Coole 2010, 94.
¹⁸⁰ Grosz 2010, 150.
¹⁸¹ Braun and Whatmore 2010b, xxi [emphasis added]. Later in the chapter they also call it ‘originary’ (xvii).
about it.\textsuperscript{183} On the one hand, an event is thus the surprise or something in need of interpretation. Connolly describes an event in this respect as something that:

happens rather rapidly; it throws some regular institutions and role definitions into turmoil or disarray; its antecedents often seem insufficient to explain its emergence and amplifications; its settlement, when under way, is uncertain; and it makes a real difference in the world, for good or ill.\textsuperscript{184}

An event often comes as a failure or a breakdown that transforms a matter of fact into a matter of concern.\textsuperscript{185} Barry, for example, is interested in the manner in which the corrosion of the metals of an oil pipeline ignites a political debate, sometimes even constituting a public that was not there before.\textsuperscript{186} On the other hand, Latour also talks about the event in terms of an achievement. In this interpretation, events are seen as successful practices of observation. As the achievement to observe those phenomena that have never been observed before.\textsuperscript{187} For Latour this is an event because it achieves to connect two previously unlinked objects, thereby creating ‘new possibilities and new questions for the concerned parties.’\textsuperscript{188} Defining events in terms of surprise and achievement thus very much depends on one’s perspective. The breakdown of a pipeline through corrosion is an achievement of the elements involved but a surprise for the people who depend on the pipeline.

Another way to indicate both the surprise and the achievement is by describing objects, including (post)humans, as folded entities. A fold refers to the manner in which an object bridges moments in space and time as well as opens up additional actions for the user. Latour, when not discussing the withdrawal or black boxing of objects, uses the example of a hammer to show how such an object folds time (the history of iron, wood, production, transport and use), space (mines, forests, factories, markets, homes) and the ‘flux of possibilities’ that the hammer offers to its wielder (construction, weapon, ornament).\textsuperscript{189} These folds are never static and always hide their own negative, simply because something that can be folded can also be stretched, broken and opened up.\textsuperscript{190} The surprise of the inherent failure is countered by the achievement of the folding itself. Brassett & Vaughan Williams draw on Butler

\textsuperscript{183} Stengers 2011, 374; Deleuze 1994; Grove 2014, 366; Bennett 2005, 457–458.
\textsuperscript{184} Connolly 2013, 404.
\textsuperscript{185} Latour 2004.
\textsuperscript{186} Barry 2013a; Marres 2005.
\textsuperscript{187} Stengers 2010, 12.
\textsuperscript{188} Ibid., 25.
\textsuperscript{189} Latour 2002, 249–250.
\textsuperscript{190} Coole 2010, 107. Compare with Adorno 1973 who discusses this in terms of a ‘non-identity’: the difference between concept and thing, with something in the ‘thing’ always resisting the concept. For a discussion see: Bennett 2004, 349, 361–362.
when they describe this as the performative politics of ... attempted closures, which are nevertheless already in excess of their own logic and give rise to unexpected, unforeseen, and disruptive effects.\footnote{191} This separates new materialism once more from strict constructivist approaches. According to new materialism, the habitual and repetitive folding of sets of relations is based on practices instead of social norms or rules as the latter do not allow for their own negative, for the hesitation that could break them open.\footnote{192} Where norms are resisted from the outside by another norm, performative practices are inherently fragile. In addition, these practices enact or perform the actual reality of the folding itself, they co-constitute subjects, objects and environments.\footnote{193} This means that folds, and the practices that create them, cannot be studied from a distance because any observation is an act itself and affects the folded object.\footnote{194}

In short, this chapter offered an example of a new materialist, post-human and relational theory by introducing Latour’s actor-network theory. While discussing this theory and its assumptions two things became clear. First, that the flat ontology and irreducibility of the objects (e.g. actor-networks) prevents this theory to explain change and instead perceives a constant regress of actants. This follows, second, in part because the theory is biased towards observable (traceable) relations and provides no guidance to observers on where to limit their research. The work of Ferias (on Luhmann) and Bryant points towards a focus on differences as the answer to this problem of virtuality in relational theories. Both argue that these differences are performatively given shape in and by the relations themselves, as these observe their own distinctions in a constant folding that constitutes themselves and their environment. This close connection between observation, acts and objects is taken up below.

\subsection{7.4.4 The Politics of Observing with Things}

While the analysis above of a relational ontology paints a very technocratic and descriptive picture of relations being entered and disrupted, such a perspective runs the risk of forgetting the politics behind such disruptions, especially when humans are involved.\footnote{195} As soon as humans are involved, either as affected or affecting party, ‘a host of ethical and political issues’ opens up.\footnote{196} A good example of a situation of ontological uncertainty and the collapse of observation and practice can be found in the many necessary real-life experimentations when introducing or transforming

\begin{footnotes}
\item[191] Brassett and Vaughan-Williams 2015, 4; Butler 2010. On closure, see Luhmann 2006.
\item[192] Stengers 2010, 16; Connolly 2013, 404–405.
\item[193] Squire 2015, 153. The term enactment is introduced by Mol 2002.
\item[195] Walters 2014, 103; Squire 2015, 151.
\item[196] Coole and Frost 2010a, 19.
\end{footnotes}
infrastructures and other technologies. The environmental impact of windmills or the social effects of smart meters, let alone the optimal configuration of a smart grid, can only be analyzed when they are build and utilized on scale. Meaning that people need to use them for others to get to know them. On the one hand, this implies that to analyze the material-discursive consequences of an artefact in its totality, it is necessary to take the risk to use it in its environmental and social context. And, on the other hand, such an experimentation not only deflates any social-material dualistic understanding, but also deflates the distinction between expertise and laypersons, as those who use the technology are as much experts as those who are experts in name. In other words, the excess potentiality of the material-discursive collapses the distinction between observation and objects and opens up to a politics of ontology, which deals with ‘the conditions of possibility [as] enacted’.

Someone who explicitly studies ontological politics is Barry in his work on the BTC pipeline in the Caucasus. He focusses in particular on the knowledge disputes surrounding the construction, maintenance and possible (environmental) effects of this pipeline. While highlighting the materiality of the pipeline, its metal construction, landscape route and material/environmental impacts, Barry argues for a better understanding of the public knowledge controversies that ‘make things political.’ Barry clearly agrees with the earlier claim of Barad that it is not about matter but about materialization and that what makes the material matter. While acknowledging the instability of matter (its vibrancy) and its ‘informational enrichment’ in case of alloys and metallurgy, matter is analyzed by Barry as something that enables and hinders, something that is represented, debated and made public or not by and for humans. In other words, for Barry matter is ultimately subject to human fears and desires.

Then again, contra Barry’s gas pipeline, it is possible to find an ontological politics at work in cases without direct human involvement. For instance, Brassett & Vaughan-Williams analyze a post-human informational enriched materiality by analyzing self-learning sensors used in the protection of critical infrastructure, in their case, natural

198 Callon, Lascoumes, and Barthe 2009.
200 Barry 2013a; Barry 2013b. For another new materialist discussion on the politics of ontology (identifying the event, debating its solution), see Schouten 2014 for a discussion on the role of the body scanner at airports from a security perspective.
201 Barry 2013b, 7.
202 Ibid., 12–13. Star 1999 actually discusses nine characteristics of infrastructure: (1) its embeddedness in other (infra)structures; (2) its transparency (once build it is there in the open); (3) its temporal and spatial effects; (4) its effects on users, through skills; (5) its effects on social practices; (6) its embodiment of standards; (7) its fixation of (capital) investments and interests; (8) its modular qualities; and (9) its withdrawal or black-boxing effects.
fresh water filtration areas.\textsuperscript{203} With the self-correcting and improving accuracy of the database behind the motion and audio sensors, Brassett & Vaughan-Williams argue that in this case it is the infrastructure itself (the sensors, databases, cables, etc.) that is performing its own – and our – security. The database raises the alarm not on an activation of the sensors, but on whether the activity that is measured falls outside the scope of its own historic irregular activities. It then adds that same measurement to the database to be used next time that the sensors are activated. The database and sensors act politically, based on the politics that is written into the program by its designers who allow the program to define its own normality curve (chapter 5.5.5).

An alternative theory that allows for an active role of artefacts in relation to knowledge is the Agential Realist theory of the physicist and feminist philosopher Barad.\textsuperscript{204} What is remarkable regarding the theoretical perspectives so far, when looking at ANT and OOO, is that in their choice for objects and relations they all seem to start from continental philosophy. Barad, however, builds her argument on insights gained from quantum theory, especially the work of Niels Bohr, and the results of recent quantum experiments.\textsuperscript{205} Based on her combination of Bohr and post-positivist philosophy, brutally brief, Barad envisions the world to be made out of ‘entangled’ ‘material discursive phenomena’ that ‘intra-act’ with each other and which exist by the grace of an ‘agential cut’ that creates differences as it delineates the phenomena from within by creating a clear object – subject distinction and defining what matters and what does not matter. In other words, contrary to the relational theories discussed so far, Barad’s theory starts from an ontology of phenomena. This helps her to open the definition of materiality to a politics of materialization and to argue for an extension of postmodern concerns on the inseparability of ontology, epistemology and ethics.\textsuperscript{206} By addressing ethics and arguing for an inseparability of these three concepts, Barad, firstly, introduces a politics of materialization, and, secondly, by linking ethics to the practices of observation introduces a radical different view on knowledge. In contrast to ANT and other new materialist offerings, Barad sees objects playing an important role in informing and determining what humans are capable of knowing in the first place. She thus argues in favor of a theory of performativity that includes not only how discourse moderates the non-discursive, but also how matter itself helps perform knowledge in a particular way.

\textsuperscript{203} Brassett and Vaughan-Williams 2015, 39–42.
\textsuperscript{204} Barad 2007; Barad 2003; Barad 1996; Barad 1998; Barad 2011.
\textsuperscript{205} Within IR, Wendt 2005 is pursuing a similar quantum course in his more recent work where he focusses on humans as ‘walking wave particle dualities’ and consciousness as a ‘macroscopic quantum mechanical phenomenon’ based on ‘panpsychism’, this highly complex and ambitious work still retains a clear humanist preoccupation.
\textsuperscript{206} Barad 1996; Barad 2003; Barad 2007.
Barad’s work leans heavily on Bohr’s insights concerning the so-called ‘measurement problem’ in quantum theory. Physicists, after having shown that sub-atomic particles can behave both as a wave (showing diffraction patterns) and as a particle (taking up a particular position in space), concluded that it is impossible for an observer to study both at the same time. The focus of the observer, even retrospectively according to recent quantum research as described by Barad, determines whether s/he is witness to particle or wave-like behavior. The example used by Barad (and Bohr) to clarify this deals with the study of momentum and position: to study momentum (speed and direction) the observer has to use a movable camera, while if an observer wants to study the position of an object s/he can only do so from a fixed position. Momentum and position are thus mutually exclusive phenomena, it is impossible to study them both at the exact same time. Often this is described as Heisenberg’s uncertainty principle, which describes this measurement problem in terms of an epistemological uncertainty: that it is impossible to know whether something is a wave or a particle. Barad, however, shares Bohr’s understanding of the measurement problem in terms of indeterminacy. For Bohr the measurement problem does not result from epistemological uncertainty but from an ontological complementarity: that the world is ontologically inseparable, and that it is the observation and the theories behind the observation that determine which properties in fact exist in the world. Both wave and particle exist and we are simultaneously moving and in position, only the observer dictates what exactly we are. From this follows the main message that Barad tries to convene, that is to say Bohr’s lesson that ‘we are part of that nature that we seek to understand.’

Barad rephrases this Bohrian insight by arguing that the practice of observation should therefore be seen as an agential cut, a becoming of reality. While the previous theories offered a range of core concepts like materialism, social structures, language, systems of communication, hybrid forms, or actor-networks of relations, Barad offers an ontology of phenomena as a solution to include all possible realities that are delineated by this agential cut. In fact, Barad argues that it is not so much the observer who makes the cut – this is still too humanist a perspective – but that the material-discursive practices that inhibit this cut create themselves. The cut originates

207 However, see the very recent work of Rozema et al. 2012 and Piazza et al. 2015, which state that it is possible to observe both without influencing them. While this places question marks behind Barad’s indeterminacy argument, it simultaneously reinforces her argument about the role that matter plays in observing matter (as we could not confirm this with older equipment), and thus the boundaries that objects enact.

208 Barad 2007, 111–113. Another example given by Bohr (as described by Barad) is when a person holds a stick: you either feel the stick, or you feel through the stick, but never simultaneously. Compare to Heidegger’s tool-in-use.

209 Barad 2003; Barad 2007; Barad 2011.

210 Barad 2007, 26, 117–118 [emphasis in original].
from the intra-action between all the ‘agencies of observation’: the observer, but also the tools, the social structures, and so on.\textsuperscript{211} Simultaneously, it creates its own \textit{agential separability}, a separation between the ‘object’ and ‘agencies of observation’.\textsuperscript{212} In the practice of observation a causal relationship is enacted between the object (a cause) and the effect or traces left on the agencies of observation (the subjects), which in turn enables a logic of objectivity resembling scientific realism.\textsuperscript{213} The origin of the cut is not a conscious choice but a result of a constant intra-acting between mutually constituting entangled agencies. (Barad prefers the concept of intra-acting to the concept of interacting, as the latter implies a relationship between two separate entities, while intra-acting refers to two entities within the same phenomena). These agencies or phenomena, are not attributes but ongoing enactments or reconfigurations of the world and only become distinct on a relational level: they never are and never will become individual entities (due to their ontological inseparability).\textsuperscript{214} Barad, however, does distinguish between different intra-actions that result in different phenomena, just as she sees that a phenomenon can be part of other larger phenomena.

For Barad, these phenomena are real; what is more, she argues that they are physical.\textsuperscript{215} She comes to this assertion through her argument that ‘knowing does not come from standing at a distance and representing but rather from \textit{a direct material engagement with the world.}\textsuperscript{216} Claiming that either the discursive or the material comes prior to the other is nonsensical, because the ontological inseparability makes these concepts, like space and time, products of observation (a la Latour). Instead the world is entangled and ‘the material and the discursive are mutually implicated in the dynamics of intra-activity.’\textsuperscript{217} At this point Barad redefines what we understand as the discursive and material. In line with post-positivist scholars, she sees discourse losing its meaning without on-going use. However, contra those scholars she reinterprets discursive practices in line with Butler and Bryant as

material (re)configurings of the world through which the determination of boundaries, properties, and meanings is differentially enacted.\textsuperscript{218}

With discourses interpreted as material differences, she continues by arguing that

\begin{enumerate}
\item \textsuperscript{211} Ibid., 31.
\item \textsuperscript{212} Ibid., 140. Thus creating ‘exteriority-within-phenomena.’
\item \textsuperscript{213} Ibid., 120. Both Barad and Latour seem to agree that linguistic/semiotic interpretation can only occur if based on such a trace or mark.
\item \textsuperscript{214} Ibid., 33, 141.
\item \textsuperscript{215} Opening her argument to claims that she is a naturalist, which she is, but not in the normal sense of the term. See Rouse 2004.
\item \textsuperscript{216} Barad 2007, 49, also 55–56 & 180–181 [emphasis in original]; Barad 2003, 829.
\item \textsuperscript{217} Barad 2007, 152.
\item \textsuperscript{218} Ibid., 151, 335. On boundaries, see 154-156.
\end{enumerate}
matter does not refer to a fixed substance; rather, matter is substance in its intra-active becoming – not a thing but a doing a congealing of agency. [...] “matter” refers to phenomena in their ongoing materialization.219

For Barad matter does not exist “out-there”, but it comes into being through its relations and observations. Clearly, this latter position, on coming to matter by hiding the cut, resembles the black-boxing of ANT and the ‘humility-of-things’ form Material Culture. This ontological inseparability of material-discursive practices leads Barad to a world made up of entangled phenomena. A world open to both sides of the ontological indeterminacy, wherein an iterative and intra-acting process of agential cuts enact particular material-discursive practices based upon agential separability, or the setting of boundaries which both define and give meaning to the phenomena itself.

One of the main implications of Barad’s framework is that one can only study a phenomenon by comparing two complementary phenomena from within a third phenomenon. Comparable to Luhmann, it is not possible to study a system from within that system. Barad, like Luhmann and Bryant, thus searches for differences. To highlight the boundaries created through differences she proposes a method called diffractive reading. This method builds on diffraction (patterns), a term used in the natural sciences to explain the effects of the interaction between waves, to show how differences create difference.220 For example, when analyzing energy security this would mean that one reads it through both new materialist and security theories and in doing so find differences and new insights at the crossing of both approaches. Another important implication of her theory of entanglement are the inherent ethical consequences if observational cuts: ‘What is on the other side of the agential cut is not separate from us – agential separability is not individuation. Ethics is therefore not about right response to a radically exterior/ized other, but about responsibility and accountability for the lively relationalities of becoming of which we are a part.’221

With her example of the brittle star, a sea creature not to be confused with the more popular sea star (brittle stars have snakelike arms), Barad clarifies both the entanglement and ethics of observational ‘cuts’.222 First, there is the notion that a brittle star does not have eyes, nor does it have a brain. As such it does not have the capacity for language, nor can its body be separated from its mind (it has none). That said, a brittle star still reacts to differences in light intensity and, above all, it can flee from its predators. Instead of eyes, brittle stars have an extensive nerve system that makes their entire body act as one big eye. Theoretically, this

219 Ibid., 151, 336; Barad 2003, 828. Compare with Black-Boxing (Latour) and Heidegger’s presence-at-hand vs. ‘ready-at-hand’.
221 Ibid., 393.
222 Ibid., 369–384.
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means that a brittle star is constantly intra-acting with its environment: it does not separate between what it sees or what it thinks, it just is. ‘For a brittle star, being and knowing, materiality and intelligibility, substance and form, entail one another...’

223 In other words, a brittle star does not face the Cartesian dualism intuitively ascribed to humans and (most other) animals. A second interesting lesson from the brittle star is that it can break off one of its arms when a brittle star is cornered by a predator. In terms of Barad’s theory, the moment a brittle star observes a predator it is thus able to discursively redraw the material boundary between itself and its environment. Sometimes these arms still wriggle; an event that is often interpreted by human observers as a survival technique. For Barad, such an interpretation would mean that the main body and arm are still part of the same phenomena, e.g., the original brittle star. However, she argues that one could also see the arm as becoming an autonomous living thing itself, especially in light of the observation that some brittle stars reproduce by cloning their arms. In the end, Barad therefore concludes that ‘[i]t’s all a matter of where we place the cut’ that defines ‘what matters and what is excluded from mattering.’

224 In other words, through the act of observation differences are cut, phenomena are enacted, ‘and knowledge is produced about “subjects’ and ‘objects’ (and ‘environments’)’...’

225 First, these cuts are never definitive. Any observation, like ANT’s settlement of relations, is a simplification of a messy reality and therefore temporary, because it incorporates its own demise. Second, these cuts are not only human made. Barad in particular highlights the role instruments play when humans gain knowledge, as when she discusses the piezoelectric transducer, a scanning device used in ultrasonography. These and other observational devices often measure only one thing (e.g. sound, light, etc.) and a such play an active role in deciding what is observed or not, especially when they stutter or break-down completely. What is more, people need particular skills to use them. Tools are thus part of the agential cut that is made. While all theoretical insights from new materialism highlight their attentiveness to a “vibrant” material world, Barad, in ascribing this role to observational tools, is even more explicit in stating how tools and objects actively influence, not only other objects but our practices of knowledge gathering as well. Third, in line with Bryant, these cuts are ontological and not epistemological.

226 Ibid., 375.
227 Ibid., 348 & 394 [emphasis in original].
228 Squire 2015, 156.
shape the world(s) in which people and things live, because they engage and perform, not because they imagine.

Together, these three observations about cuts create a theoretical approach that calls for a certain humility and perhaps even a sense of vulnerability of humans. For if everything is both affected and affecting, then, as Butler states, ‘one’s life is always in some sense in the hands of the other.’ Together with Butler, Latour and other new materialist, Barad argues that we are responsible for each other. Not in the sense of a responsibility towards the other, as in a typical security relation, but in the sense of a responsibility for us both, comparable to the discussion on scarcity, which dealt with both you, me and an unseen third-party victim. Such an encompassing responsibility thus explicitly includes, according to Tuana, a responsibility for those ‘practices that account for not knowing,’ those actively ‘ignored or rationalized’ accounts of issues like food insecurity or energy poverty. As Latour writes on the morality behind technology:

Between the gesture of switching on my computer and what I write on the screen, I can either ignore the nuclear industry which enables me to work this morning, or find myself immersed in the uncertain destiny of that same industry which forces me to take account of the burial in deep silos of the waste from its stations that the French do not support.

To deal with this implicit choice, Hekman offers the concept of disclosure to approach these settlements (e.g. cuts, actants or assemblages). Based on a Baradian ontology of intra-action and a Critical Realist perspective on scientific research, Hekman proposes that the concept of disclosure can ‘bring to light’ a variety of aspects and perspectives of a settlement. None of these disclosed messy realities is more truthful than the other, but, in a critical realist sense, Hekman does see them as materially braced and hence comparable on objective grounds. Alternatively, Bellacasa introduces the ethical and more critical transformative duty for matters of care, which builds upon Latour’s matters of fact and matters of concern. As she would have it, to explain matters of fact or Barad’s agential cuts, one needs to explain them with care by respecting all those involved in the initial becoming by giving them a voice once more. In the obligation for observers to give those who are silenced a voice, to care for all those involved - even if that means that in each instance they actively choose

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230 Butler 2009, 14; as quoted by Holmqvist 2013, 549; Braun and Whatmore 2010b, xxv.
231 Dolphijn and Tuin 2012, 69.
232 Tuana 2008, 19 [emphasis in original].
235 Bellacasa 2011.
for whom to care more – scholars are not only part of what they study but also play a critical transformative role in a world of becoming.\textsuperscript{236}

In closing, Hekman argues that Barad’s agential realism shows promise as it is grounded in local experiences, collapses the material-social dichotomy, focusses on boundaries and boundary drawing practices, and draws ethical conclusions from practices of knowing/observation.\textsuperscript{237} This chapter can only confirm Hekman’s summary but adds that Barad, in pushing for a material-discursive entanglement, a subject-object-environmental enactment and a relational intra-action, challenges any and all dialectical understandings while favoring an understanding of the politics behind ‘materialisation and dematerialisation over a prioritisation of matter or materiality.’\textsuperscript{238} In other words, while it is impossible to separate the material from the discursive and to observe without acting (humans and non-humans), Barad offers an understanding that one should be aware that it is mainly politics, broadly understood, that deals with the virtuality of matter. Here we touch upon a paradoxical claim in her argument, because while she acknowledges the activity of tools to an extent not seen elsewhere, she also discusses this ethical politics overwhelmingly in terms of observing scientists, as in the example of the brittle star. In the end, it seems that Barad too refers back to humans, although no longer masters of the universe, as willfully reflecting and trying to shape the material-discursive to their preference.\textsuperscript{239}

\section*{7.5 Reflection}

In response to the mostly sociolinguistic understandings of energy security, scarcity and security presented in the earlier chapters, this chapter started from the materiality of energy systems and examined the role and importance of matter in relation to the knowledge over matter. The chapter started with a discussion on the Cartesian material-social duality within IR by opposing critical realism and radical constructivism. This debate highlighted a strong theoretically induced epistemological argument against representational knowledge as favored by positivism. In other words, that it is impossible to know what we observe objectively and truthfully. For many this is not a new argument, and in fact, it lies at the core of the critical theoretical understandings of scarcity and security in earlier chapters against most current work on energy security. Still, chapter 7.2 discussed a matter of contention between these

\begin{itemize}
\item \textsuperscript{236} Ibid., 100.
\item \textsuperscript{237} Hekman 2010, 73.
\item \textsuperscript{238} Squire 2015, 151.
\item \textsuperscript{239} Not in the sense as feared by Grove: ‘Some will argue that we privilege the discursive because we have privileged access to the world of “our” making. The problem is that such a position often reifies the belief that the world is of our making.’ Grove 2014, 368.
\end{itemize}
strands of theory, in particularly on whether the pursuit for scientific knowledge, even if never complete, nonetheless is worth pursuing as it might be possible to judge between knowledge claims in search for the better explanation. While this debate is ongoing in IR, chapter 7.2 ended with new materialists who questioned the absence of the non-discursive world in, especially, the radical constructivist theories dealing with meaning and discourse. Without the non-social, new materialist claim, one neglects alternative sources of change and order that drastically influence human life.\textsuperscript{240} Chapter 7.2 concluded, however, that the critique of an absence of anything material in critical and radical social theories was too strongly phrased, as original post-positivist theories were acutely aware of the interplay between knowledge and the material world but made the choice to focus on that interaction through a deeper understanding of the social aspects.\textsuperscript{241} On the other hand, it could be argued that the many one-sided attempts to translate these linguistic insights into empirical research do eschew anything material and hence validate part of the new materialist claim.

In turn, the new materialist alternative seemed to have proceeded in two phases. The first phase was mainly focused on showing the relevance of the non-social world against linguistic-oriented post-positivist theories. Chapter 7.3 in this respect put forward the shared assumptions of new materialism, including its adherence to the epistemological critique of post-positivists, its trust in a world outside of humans, its focus on a local becoming of relations, and the ethical consequences inherent to it. This chapter also offered a partial reprise of the ways in which the material is used and spoken about. Besides the many meanings and different terms used to describe “the world-out-there”, the material was discussed, as something non-social, as objects outside of human influence or as objects with relational qualities (durable, hard, colorful, and so forth.), with a special reference for those technological artefacts that are made by humans. Based on the latter category questions were raised towards the traditional separation of matter as something passive or active and as instrumental or deterministic. Even without man-made artefacts breaking down the dialectics of this understanding, these logics where questioned from within, based on spatial and temporal variables. The chapter ended with a core approach that most new materialist use, namely an extended understanding of Butler’s performativity or the reiterative acts of materialization of discourse that create social effects. Bennet’s example of the Northeast blackout was used to highlight a performative approach that simultaneously introduced the core aspects of the next chapter: the relationality of the different interacting nodes of the electricity grid, the surprise of unintended and unanticipated material effects, and the ethical impact of the decision on accountability that follows such a relationality.

\textsuperscript{240} Sources of durability, resistance, sedimentation, triggers, etc.

\textsuperscript{241} See also Lemke 2015.
In turn, chapter 7.4 offered a network inspired relational ontology by describing how one of the core approaches, namely a relational ontology like ANT, sees the world. In analyzing the ontological assumptions of ANT, what emerged was an empirical oriented methodology that assumes a network of relations, a network of actants (actor-networks) which are post-human and irreducible, which stand on equal footing in a flat ontology, and which relate with each other through traceable translation (action at a distance) and a withdrawal from their relations when made possible. However, just as social theories are questioned on their voluntariness, these networks are vulnerable to an infinite regress argument. Meaning that there is no end to one’s observation, while simultaneously scholars only observe fixed traceable relations, relations that are already engaged, never those that become.

The story of new materialism as described in this chapter hence moved to a second phase and the discussion on how to incorporate the virtual or potentiality in already actualized networks of relations. In other words, how to explain the transformation of beings while still allowing for independent objects. This virtuality was later described in terms of the vibrancy of the material-discursive. This vibrancy in turn was described as eventful, with the event acting both as a surprise and as an achievement. On the one hand, there are things that make us think and react. On the other hand, there are the achievements when multiple relations and realities are folded together, when connections are made and analyzed in terms of its eventfulness.242 With events interpreted as either surprises or achievements, the virtual and actual were placed and found in the performative folding of practices. Earlier described as a withdrawal or black-boxing of agentic capacities, a fold is thus the closure of a phenomenon, but a closure that is always incomplete and incoherent as it contains a negativity or excess. In other words, a fold enacts the nodes of a network or the single object-like entities that we see as irreducible.

Part of the fold is the practice of observation, both outward and inward. By defining successful observations as achievements, this turned observations into an activity. Meaning that, as an activity, knowledge gathering becomes a form of “manipulation”, a politics of knowledge on the ontology of an event.243 Chapter 7.5 discussed the politics that ensues from such a material-discursive interpretation of life. Following the phenomenological agential realist approach offered by Barad this chapter argued for a closer attention towards the ‘agential cut’ when observing a phenomena, object, practice or event. In connecting ontology, epistemology and ethics, these cuts, whether enacted by humans or non-humans, affect the observed event itself (thereby offering the only truly non-human active theory in new materialism). They create difference.

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242 While stated in a different language, this is the essence of security: both surprise and closure.
And as difference, these cuts call for a political awareness and ethical reflection on the cuts and where to place them.

Barad and new materialist scholars therefore call for an ethics of responsibility and care for the relations that are observed and enacted and those that are excluded. Once observation is seen as the creation of difference, the practice of observation by an assembly of humans and non-humans becomes a performativity that creates its own reality. The practice of observation defines what comes to matter and what does not. As such, observation has long lasting ethical consequences for that what is not observed; that excess or negativity within the fold that will ultimately break it. Knowing this, new materialist scholars like Barad and Bryant – although a similar account of difference can be found in Luhmann or Derrida – argue for an ethical awareness towards the broader “us”. What new materialist theories thus add is a material-discursive understanding of the vibrancy of life and the politics of difference. This enables an understanding of creativity, durability and adaptability while disrupting understandings of the social and material, the future and the past, as well as expertise and laypersons.

In the end, the direct link between energy and this chapter is strong but difficult to make clear. For one, the diverse array of materialist focused theories help to explain the underlying dynamics of the post-positivist argument in security and scarcity debates (as well as defuse any comments that the discussions in those chapters neglect the materiality of energy systems). They offer a fuller account of performativity, one that even pushes the practice theories within the security literature. They also help turn the focus towards the politics of ontology and, especially, the role of observation and knowledge in achieving closure. Moreover, they lead to a drastic ethical rereading of practices of observation and the role that knowledge gathering plays in shaping the world. In other words, they deflate the distinction between ontology and epistemology, between a politics of ontology and a politics of knowledge. In general, this chapter describes the potentiality and vitality of the endless set of relations of matter as life itself. However, to acknowledge a more-than-human world while keeping up with the epistemological critique of post-positivist scholars is a challenge all on its own. With Barad’s materialized discursivity and a substance-less materiality the chapter returned to the same questions of radical social constructivists: how to account for the actuality and virtuality that can be found in-between the discursive and non-discursive. In the end, while new materialist offer an account based on the materialization of potentiality, they also acknowledge that this only matters because of politics. The next chapter will therefore focus on how humans govern their world through a material-discursive environment.