

Actor Network Theory, After-ANT & Enactment: Implications for method

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Introduction

Given my interests in the more-than-human world (Abram, 1996), I was drawn to Actor-network theory (ANT) due to, among other things, the place that nonhumans are ascribed within the theory. Initially, I was interested in developing some kind of ANT-informed methodology or methods that would meaningfully engage with notions of the nonhuman as an equal¹ to the human. The notion of the actor and of the actant² was a concept that initially attracted me to ANT. At the time, I believed that my research would ultimately examine the various ways that birds in the bird-birdwatcher relationship are represented and understood. Rather than uncritically accepting the idea that a bird or a birder exist prior to the act of birdwatching, I wanted to “focus on the complex and controversial nature of what it is for an actor to come into existence.” (Latour, 1999b, p. 303) As such, I turned to ANT to see if it would offer any insight into investigating if and how birds are actants in the bird-birdwatcher relationship.

Now, at the other end of this inquiry, I have come to the conclusion that ANT³ does not offer what I had initially anticipated it would. ANT should not be seen so much a singular theory as “a range of social science fields” (McLean & Hassard, 2004, p. 494) with a similar ontological underpinning. Originally, I suggested that part of the field of inquiry for this Comprehensive would be to investigate other ANT theorists’ perspectives on nature as Bruno Latour’s⁴ perspective was different when compared to my own. Part of my work in this Comprehensive would be to scrutinize these questions of ontology. I have managed to do so, and this particular academic endeavour has been the most intellectually rewarding aspect of my work.

This Comprehensive started out looking at ANT as inspiration for method, but as you will read, it has evolved—while I am still interested in method, I turn to other discourses to inform my own perspectives rather than relying only on an

¹ Let me note that I am not as interested in equality between human and nonhuman now as I was at the beginning of this inquiry.

² The term actant is “used to include nonhumans” (Latour, 1999b, p. 303) as actor is often perceived as only being human.

³ What I would rigidly define as the thought emerging from this field during the late 80’s and early 90’s

⁴ The only ANT author I had read at the time.

strictly ANT-informed perspective. The recent work by Law (2004b), Mol (2002) and Law & Singleton (2005) on objects is very much influenced by ANT thought. Engaging with the same philosophical questions, after-ANT and other associated concepts influenced by ANT and poststructuralist thought take a different path in reaction to ANT's own philosophical assumptions and critiques. As such, part of this work is to demonstrate my own movement from ANT to this new perspective, and so I begin with an introduction to ANT, a discussion of its philosophical assumptions and, finally, my own and others' critiques of the field.

An overview

Intellectual beginnings

With headwaters in sociology, science and technology studies (STS), post-modernism and philosophy, early works in the field of ANT began to emerge in the late 1980s and early 1990s. Early ANT thinking was directly impacted by work done in the STS-related field *sociology of science*. Academics, such as Latour & Woolgar (1986), questioned the taken-for-granted understanding of the way in which scientific knowledge was created. Important for early ANT thinking was Latour & Woolgar's (1986) supposition that scientific knowledge is made real through inscription devices⁵ and practices. Rather than operating within a metanarrative of forward progress and uncovering a "true" representation of the world, STS shows how science operates at local level without a telology (Rheinberger, 1997). Echoing this, a common theme throughout ANT writing at this time is the (often hidden) role that science and technology⁶ have had in structuring and legitimizing knowledge (see Latour, 1988; Latour, 1991; Woolgar, 1991, for example) such that the categories that appear to be the *ipso facto* reality

⁵ Inscription devices are a "patterned set of arrangements for producing inscriptions or traces out of materials that have been made to take other forms" (Law, 2004c, p. 6) which in a laboratory setting, such as Latour & Woolgar (1986) were describing, usually meant a machine.

⁶ Science and technology should not be read as static culprits in the act of legitimizing knowledge. Who and what gets to reify and classify what *counts* as real or right transform over time: this becomes evident (within the context of the emergence of ANT) in Law's (1986) work. This theme is taken up and further developed by other authors, with Anamarie Mol's (2002) work being the most engaging and sophisticated. I will be discussing her work in the *After ANT: the move to objects* section of this work.

are, in fact, a creation. The work conducted by sociologists of science was significant to the development of ANT because in inscription and practices, it is suggested that there is a difference between the world as it exists and the world as it is known. Also impacted by post-modern taking place at the time, first-wave ANT was concerned about *construction* (Law, 2004c) and more specifically, how taken-for-granted realities are really built (and in turn, not so taken-for-granted).

Works by Bruno Latour (1993), Michel Callon (1986) and John Law (1986) have been described as the nucleic beginnings of ANT (Castree, 2002). While at the time these authors would not have described their work as falling within a labelled field of inquiry, what defines these papers is their shared ontological perspective on the nature of reality and, in turn, their shared questioning of the location and creation of categories and ways of thinking. ANT was offered as an ontology to transcend binarist thinking, in which *hybrids* or *quasiobjects* (neither entirely natural or social) are not recognized (Castree, 2002).

ANT's main principals and the "problems" it deals with

ANT, used as a critical tool against notions "as diverse as institution, society, nation-state and, more generally any flat surface" (Latour, 1999a, p. 15), attempts to investigate the role that objects play in the creation of networks of relations. As defined by *The Dictionary of Human Geography*, ANT is the "study of heterogeneous engineering: 'heterogeneous' because it is concerned with a vision of the world as a multiplicity of different connections (translations, associations, mediations); and 'engineering' because it sees these connections as fabricated out of a diverse range of materials." (Thrift, 2000, p. 4) ANT has been described as being based on four main principles:

1. the usual boundaries that constitute western knowledge (binary separations such as: culture/nature; local/global) must be ignored;
2. rather, the world is created by networks of association (through acts of heterogeneous engineering) which are made by the traffic through the various networks' links;
3. the durability of actor-networks depend on *immutable mobiles*: objects that can move from one place to another without changing and

4. messengers, the performers of associations between the networks, are the most important elements of the world as they work to keep networks connected. (Thrift, 2000)

While the definition of ANT and its principals appear in a dictionary of human geography, it holds broader disciplinary appeal as a method of inquiry. Academics from a variety of fields, well beyond the focus of my own work⁷, have been inspired by these theoretical underpinnings. For a theory that has become a “major force in the social sciences” (Thrift, 2000, p. 5), ANT was not meant by its theoretical originators to be a stand-alone theoretical approach *per se*. As such, ANT has not and does not purport to offer a common set of methodological tools with which to conduct investigations “in its name.” This fact, however, has not stopped the use of ANT-informed theories to effectively critique the notion of nature (see Eden, Tunstall, & Tapsell, 2000; Hitchings & Jones, 2004, for example). For dealing with questions of nature, ANT engages especially well with five “problems” that have emerged with past and present work on nature: binarism; asymmetry; conceptualizing actors & action; and a ‘centered’ understanding of power (Castree, 2002, p. 117). Castree’s disciplinary focus is on what he calls *left geography*, and while this focus is not wholly in line with my own theoretical alignment and needs, I still find his discussion, with few exceptions, relevant and insightful for my own work. As such, I will outline his argument, emphasise his important distinctions and reveal where I did not find as much relevance to his work.

Binarisms

Latour summarizes in the thesis of his book *We have never been modern* (1993) that modernism, though it insists on a clean, distinct separation between the human and the nonhuman in fact, unwittingly creates a wealth of hybrids. These clean, distinct separations lead to binary thinking, where problems and solutions are conceived of as existing in either one end or another. Latour (1993)

⁷ A (non-exhaustive) list of these areas of investigation would include: economic systems (Callon, 1998); organizational studies (Bloomfield & Vurdubakis, 1999; Fox, 2000; Hardy, Phillips, & Clegg, 2001); and sociology (Bruun & Langlais, 2003; Preda, 2000).

writes that “the word ‘modern’ designates two sets of entirely different practices which must remain distinct if they are to remain effective, but have recently begun to be confused.” (p. 10) These practices are *translation* and *purification*. Translation “is the mechanism by which the social and natural worlds progressively take form” (Callon, 1986, p. 224) that “creates mixtures between entirely new types of beings: hybrids of nature and culture.” (Latour, 1993, p. 10) Purification “creates two distinct ontological zones: that of human being on one hand; that of nonhumans on the other.” (Latour, 1993, pp. 10-11) This hybrid actor is said to be created from the fusion of two other agents, where the third agent is subject to translation, the “displacement, drift, invention, mediation, the creation of a link which did not exist before and that to some degree modifies the original two.” (Latour, 1988, p. 179) Being modern is considering translation and purification separately; “we willingly subscribe to the critical project, even though that project is developed only through the proliferation of hybrids.” (Latour, 1993, p. 11) It is suggested that this then leads to a better understanding of the nature of reality as it does not prematurely or irresponsibly separate actors that are, in fact, closely associated. ANT sees the premature categorical closure for binaries’ sake as ontologically incomplete, leading to “a conception that entities are ‘essentially’ either social *or* natural prior to their interaction with one another.” (Castree, 2002, p. 118, author’s emphasis) While ANT can be used as a tool to engage with all binarisms, Castree (2002) suggests that for investigations into nature, ANT engages with two especially important binaries: the social-natural and the local-global dichotomies.

Social-natural dichotomy

Latour (1993) suggested that the hole in the ozone layer as an example of an object (his term is “imbroglio”) that is neither totally human nor totally nonhuman. When examined, however, the hybrid nature of the hole is often ignored and any discourse about the hole is cast as a dualistic problem existing between humans and nature. ANT offers theorists a way to connect the social and natural into the socionatural and, in turn, describe a richer world than previous dichotomous society-nature accounts would allow (Castree, 2002). Problematic,

then, in the thinking ANT is reacting to is the propensity to strictly see problems and solutions in terms of absolute, dualistic categories. In the case of the ozone layer, a technological solution (seen as existing on the social side of the binary) of banning CFCs is offered to “fix” the hole in ozone (existing on the nature side). Thus, dualistic thinking is described as being faulty as it “ultimately resorts to one pole or the other—society or nature—as explanatory [whereas] ANT refuses to look for causes lying *outside* socionatural networks.” (Castree, 2002, p. 118, author's emphasis)

As such, rather than existing in a strict social-nature dichotomy, Latour offered the concept of the *human-nonhuman continuum*, which gains its significance in its conceptual rejection of dualistic thinking (Latour, 1999b). For Latour, nonhumans include anything that is not human: the computer that I am currently using to type this sentence out is as much a nonhuman as the birds that I am interested in studying. This is to say that an object exists along a continuum or as a blend of attributes, rather than existing in an either/or polar configuration. Of importance is not the object’s location on one side of the binary or the other. Rather, how that object is located in a network of relations becomes the focus of analysis.

Local-global dichotomy

Castree (2002) offers the local-global dichotomy as the second of two binaries he believes important to investigations of nature. In my own reading, I did not find it quite as enlightening and relevant for my own work as the social-natural dichotomy. Given that Castree was writing for a geographical audience, his focus on this dichotomy makes more sense. That being said, because ANT thinking is focused on describing the topological networks of relations, there are some important observations to be made about objects and their location within networks. With typical binaristic thinking, the local and the global are used too often in problematic ways. Castree (2002) suggests that all parts of a network “(be it long or short) are, at some level, causally important in ensuring that it holds together or endures.” (p. 120) Thus, it is not the *distance* that is important but rather the *connectivity* between objects in a network. Additionally, when

investigating networks of relations, network durability and length needs to be examined from the inside—not explained by external causes that are natural *or* social, global *or* local (Castree, 2002) as there might be important, tight, connections between objects that would otherwise be imagined as being, geographically, far apart.

Asymmetry

In certain strong social construction discourses, the natural has been seen as a construct of the social. I have never felt that comfortable with such strong social constructivist perspective. As I wrote in my M.E.S. major paper, I find it anthropocentric to assume that phenomena external to humans (be they called nature or not) are socially created and, in turn, limit the ability to engage with those objects that fall within our conceptual sphere. Castree (2002) suggests that ANT makes the move beyond an asymmetrical (read: social construction) approach to nature by recognizing society and nature as “*co-constructive* within myriad networks.” (p. 120, author’s emphasis) Thus, the concept of *symmetry* is important to invoke in order to describe these hybrid relations. Michel Callon, in early ANT work, describes the intended aim of symmetry:

The goal is not only to explain conflicting viewpoints and arguments in scientific or technological controversy in the same terms. We know that the ingredients of controversies are a mixture of considerations concerning both Society and Nature. For this reason we require the observer to use a single repertoire when they are described. (1986, p. 200)

Symmetry does not mean that either the natural or the social exist independently of each other. Rather, it is an understanding that with a symmetrical approach it is possible and necessary to attend to the “ontological, causal and moral particularities of natural entities...*without* reverting to the notion that nature is, should or could be a/social.” (Castree, 2002, p. 120) In this light, Latour’s (1999b) comments that nature “is not considered as the commonsense external background of human and social action but as the result of a highly problematic settlement” (p. 308) are not so problematic for me. Initially, Latour’s perspective was hard for me to understand and I misinterpreted it as being constructivist

itself. I now understand co-construction to mean that the ontological status of objects is not to be taken for granted. It is not an attack on that phenomena which is within (or outside) my conceptual sphere as not being nature, rather it is a focus that “seeks to identify how relations and entities come into being together” (Murdoch, 2001, p. 111) with the implicit understanding that objects outside my sphere are capable of “social” lives. Symmetry adds agency to the objects in the networks and this is where Castree turns next.

Impoverished concepts of actors and action

Other theoretical approaches to nature have been argued as suffering from a limited perspective of actors and action in three critical areas: an actor’s capacity for action is defined by their (perceived) limits; these limits are usually anthropocentric, based on linguistic ability or a positivistic view of what is possible for the actor; and what gets to count as an actor is (usually) human (Castree, 2002). Murdoch (2001) writes that, rather, we should consider:

“ANT to be both co-constructionist and ecological: it is co-constructionist in the sense that it emphasises relations and the way that discrete entities or beings emerge as these relations are consolidated; it is ecological in the sense that it seeks to overcome any underlying distinctions between natural and social entities, thereby extending agency to nonhumans as well as humans.” (Murdoch, 2001, p. 120)

Given ANT’s approach in rejecting dualisms and focusing on co-construction, agency, rather than focusing on knowing and describing limits, is “a relational effect generated by...interacting components whose activity is constituted in the networks of which they are a part.” (Whatmore, 1999, p. 28, as cited in Castree, 2002) So, ANT does not focus on acting as an anthropocentric gatekeeper for agency. The approach attempts to accept actors as being a combination of both social and natural, calling “for a conception of action and actors which is multiple, contingent and nonessentialist” (Castree, 2002, p. 121), where action is conceived of not requiring “speech or intentionality as we normally understand it” (Castree, 2002, p. 121). This allows agency to be conceptualized in such a way that opens the possibility to include, or at least consider, diverse forms of action and, in turn, diverse actors. While not implicitly connected, I see in ANT’s

approach to actors echoes of Cheney & Weston's (1999) ethics-based epistemology, where the authors describe a need to approach others being open to the possibility of an ethical encounter rather than with the expectation that others need to prove their agency prior to ascribing them value and worth.

Power

With the risk of summarizing the goals of ANT into a grand narrative myself, at the heart is the call for the actor or actant to replace subject/object and symmetry to replace dichotomy (Latour, 1999b). Key in this movement is an understanding of *power* and what influences how it is conceived. From the earlier problems outlined by Castree (2002), specifically the social-natural dichotomy and impoverished concepts of actors/action, it can be seen that other approaches to nature too often conceive of power as anthropocentric and thus, centered on the human (Castree, 2002). In fact, I would like to argue that conceiving of power in this way is the lynchpin from which these other problems emerge. ANT conceptualizes power as “a *shared* capacity, involving myriad natural actants as much as social ones, which is thoroughly *decentred* in different networks.” (Castree, 2002, p. 121) Power does not come from an actor somehow “possessing” it, but rather from being able to enrol, enlist and convince other actors to allow the initial actor to represent them. (Murdoch, 1995)

Michel Callon's work on the marine biologists, fishermen and scallops of St. Brieuç Bay (1986) is at one level, a narrative about actors: a group of marine biologists, fishermen and scallops. However, concepts of power and power relationships are central to Callon's theoretical work in this article and help illustrate Castree's (2002) description of ANT's conceptualization of power. Thus, in addition to introducing us to the actors of the story, Callon investigates the networks that connect actors' “identities and links between them.” (1986, p. 205) The story in the paper is meant to “lead to a better understanding of the establishment and the evolution of power relationships.” (Callon, 1986, p. 201) The network, in the Callon article, exists as a whole and connects all of the actors together. Though the actors may exist within the same network, according to Callon, this does not mean that all actors have equal access to each other in the

network. Rather, the concept of obligatory passage points (OPP) is introduced to show how some actors in a network can act (or, at least attempt to) to focus or direct other actors. I envision OPP as a node in a network, where seemingly different threads of the network must come together and pass through in order to carry on elsewhere. Power in this arrangement lies in the ability to require other actors to pass through a particular point. The ability of one actor to lock other actors into a place is the act of *interessement*. Reality then, is a “process” (Callon, 1986, p. 207) and in the attempt to invoke one particular reality, the imposition and stabilization of an identity is *interessement* in action.

Intressement devices can be both physical and metaphorical. Tow ropes and ocean currents (both physical in nature) as well as seduction are described as acting to aid or oppose the engagement of the *Pecten maximus*. Callon suggests that “success is never assured” (1986, p. 211) with *interessement*. Something only becomes static when it becomes *enrolled*, described as a “device by which a set of interrelated roles [are] defined and attributed to actors who accept them.” (Callon, 1986, p. 211) The agency of those in the network is evident in the concept of enrolment as Callon suggests that actors have the ability to accept if they are to be enrolled or not. Callon suggests that *Pecten maximus* larvae, through the actions of the scientists, transform into numbers, tables and curves. This process comes to reify power in the favour of the scientists as they now speak for the scallops. In this case the *interessement* is short-lived: the scallops and fisherman reject the power of the scientists and become dissidents.

In this example, power can be seen as relational achievement and not as a “monopolisable capacity radiating from a single centre or social system” (Castree, 2002, p. 122). While an actor may hold power and represent the “silent actors of the social and natural worlds they have mobilized” (Callon, 1986, p. 224) these networks are never stable and it “becomes possible to identify multiple points, neither social or natural but both simultaneously, at which network stability can be contested.” (Castree, 2002, p. 122) Power not only lies with scientists and fisherman, but also scallops and ocean currents. And while actors can accept to be spoken for, this relationship is never so rigid that a different network could emerge.

Key definitions, concepts and some implications for method

Actor

Actors are conceived of as the human or nonhuman members of a network of association. For Callon (1986), who and what is an actor should be questioned at the same time as questioning who and what is a society. Callon believes that through asking those questions and examining the answers, one can “...explain how they define their respective identities, their mutual margins of manoeuvre and the range of choices which are open to them.” (1986, p. 201) Latour (2002) writes that we should learn from actors without imposing *a priori* assumptions of their world building capacities. In this statement there lies the understanding that *any* actor is capable of world building. This assumption is critical to the success of ANT as it, in theory, allows for the locus of power and agency to fall outside of traditional definitions. Much of Latour’s case study work has to do with the study of science and in this work test-tubes and lab notes, acting as inscription devices, are ascribed agency and power (for example, see Latour, 1987, 1988; Latour & Woolgar, 1986).

Part of what initially drew me to ANT was the notion of ascribing status and power to the non human and as such, I believe it holds promised to be a meaningful way of engaging with my area of research. While my focus was on the *living* non human, I have come to realise that there is meaningful work to be done if I include *non living*, non human objects in my work. These objects, such as binoculars and bird books, play an important role for birders and I anticipate they help shape the network of bird-birder associations.

While I agree with other concepts of the actor (no *a priori* assumptions as to what might be an actor, learning from actors what they do and how they do it), this is not as revolutionary for my own thinking. I see echoes of phenomenography, for example, in these kinds of statements. When I was conducting my M.E.S. research, it was suggested that I attend to and *bracket* my own assumptions on what nature might be. I hear a similar echo in ANT’s call for no *a priori* assumptions. As I outlined in my M.E.S. major paper, this may be easier to propose than to actually do. I wrote that even with holding the best

intentions to bracket my prior assumptions, I had to reject the possibility that I could bracket objectively and completely. Rather, what was important in this act was listening for and being open to the (different) possibilities that *may* emerge. Regardless of its intellectual origin, being open to the unexpected or unknown actors and relationships will be a focus when I conduct my research.

Networks or Collectives

When first proposed in the late 1980's to describe heterogeneous associations, the term *network* did not have such common usage and as such, held different meaning. Today, networks, as symbolized by the World Wide Web, represent the unfettered transmission of knowledge whereas, originally, networks were meant to represent a series of transformations, translations, and transductions (Latour, 1999a). Callon wrote that often the simplest questions invoke both the natural and social world, and, in so doing, a series of actors, their relationships and the links between (1986, p. 205); it is in these relationships and links that networks emerge. Rather than invoking the concept of a network, Latour (1999b) engaged with the idea of a collective: "Instead of the three poles—a reality 'out there,' a mind 'in there,' and a mob 'down there'—we have finally arrived at a sense of what I call a *collective*" (p. 16, author's emphasis). Regardless of the term used, actors are "caught up" or actively "catch" actors. Networks are made and re-made. It takes effort to keep objects in a network related to each other. This has important ramifications for the durability of objects: "when a phenomenon 'definitely' exists this does not mean that it exists forever, or independently of all practice and discipline, but that it has been entrenched." (Latour, 1999b, pp. 155-156) Rather than the durability of actors and networks existing in perpetuity,

Latour dissolves the power of logical coherence by arguing that in as far as the world hangs together this is a matter of practical associations. How far these associations reach isn't given with the birth of a new configuration. Unlike epistemes, networks are open. The elements within a network may link up with other elements, outside the network. But such external links are not different from internal links. They're all associations. Each new and successful association makes a network larger. But however great the difference between the coherence in a network and logical coherence, to talk of "associations" does

have a homogenizing effect. Either an association is made or it isn't. An element is either inside or outside a network. (Mol, 2002, pp. 65-66)

Thus, while networks and collectives may seem static, they are in fact transient. The movement of some networks are easier to perceive than others. When examining seemingly well-established networks of associations, while the network may appear to be stable for the long-term, effort is still required to keep the meaningful relations of the particular network associated.

Immutable Mobiles

The concept of immutable mobiles is key to early work in ANT (in Latour, 1987, for example), where an actor, actively engaged in a network of relations gains the ability to move without changing identity. In practice, this concept helps explain the phenomena of a business like McDonalds, where the “same” product can be found around the world (Urry, 2000). Law & Singleton suggest an immutable mobile is:

“something that moves around but also holds its shape. Indeed in this way of thinking, it holds its shape in two importantly different ways. On the one hand, it does so in physical or geographical space. On the other, it holds its shape in some relational and possibly functional manner where it may, to say it quickly, be imagined as a more or less stable network of associations.” (2005, p. 335)

With birding in mind, I see objects like bird books (Sibley, 2003, for example) and bird identities (e.g.: the organism known as *Passer domesticus* or the House Sparrow) as immutable mobiles.

Critiques of ANT

Where is nature?

It would seem that with ANT's focus on the hybridity of nature and society, and the possibility of an actor being either human or nonhuman, that the approach would offer an enticing and engaging approach to the more-than-human world. However, I found as I read primary works (of both a theoretical and practical nature) in the field, I was left somewhat disappointed. Everything that is not seen as human is (quite often) uncritically seen as nonhuman. This perspective has the potential to act as a tool to dissolve nature/culture divides

and initially may not be seen as problematic. However, when investigating hybrid spaces nonhuman actors are often room keys (Latour, 1991), sailing ships (Law, 1986), laboratories (Latour, 1988) and firearms (Latour, 1993). Even in works (Callon, 1986) that have been cited as focusing on the more-than-human world, that world seemingly does not exist outside the human. In my opinion, the problem is this: actors appear to be valued the same, regardless if they are living or non-living. Haraway echoes these concerns when she critiques the science studies of Latour and others with their “...too narrow a concept of the ‘collective,’ one built up out of only machines and scientists, who are considered in a very narrow time and space frame.” (2004, p. 115) There is homogenization of what it is to be an actor. In the focus on the collective and hybrids, it is difficult to assign value and worth to difference.

While attention to symmetry is important to the practice of ANT, I find that practically speaking, it is impossible to be able to treat all actors equally in any account. Latour appears not to share this perspective. He suggests that in allowing these accounts to emerge without prior judgement means that one needs to subscribe to the belief that the “...the modern collective is the one in which the relations of humans and nonhumans are so intimate, the transactions so many, the mediations so convoluted, that there is no plausible sense in which artefact, corporate body, and subject can be distinguished.” (Latour, 1999b, p. 197) Succinctly, he is saying that labelling and separating the human and the nonhuman is impossible given their intimate and convoluted relationship. On one hand (especially given the examples he usually furnishes), this does make sense: I can see that the ozone layer is an actor that is connected in a network of human and nonhuman actors and that “pretending” it exists solely in the nonhuman domain does little to move discussion about the ozone layer forward. However, I believe that it is telling that the “animals and nature” subsection of an annotated bibliography of ANT works⁸ (Law, 2004a), the non-living, nonhuman

⁸ A momentary aside: Given the focus on heterogeneous networks that include both the human and the nonhuman, I am surprised to find that there is an “animals and nature” subsection to this annotated bibliography. Why? It seems nonsensical to have a section with nature in the title when seemingly work taken up by ANT attempts to show that nature is something that should be

actors draw the living, nonhuman actors into their own networks. In the articles cited the living, nonhuman actors exist in relation to a strict, human-mediated network and actors: a cat interacts with a human and a cat-flap (Ashmore, 1993); trans-species tissue exchange (Brown, 1998); scientists and scallops (Callon, 1986); and the emergence of germ theory (Latour, 1988). In these articles in particular and as I have observed as a general feature of ANT, the living nonhuman actors are not examined outside a network that directly relates to humans. In the articles cited above, a cat exists in relation to a network of human ownership and cat-flaps; nonhuman organs are used for human surgery; scallops exist as resources (both food and scientific) for humans; and bacteria are explained as “not existing” prior to the emergence of a (human) germ theory. In these examples, the human is always the focus of the network of association. Haraway writes of animals inhabiting “neither nature (as object) nor culture (as surrogate human), but instead inhabit a place called elsewhere” (2004, p. 116) in Western philosophy and practice. Where are, for example, ANT-informed investigations of flower pollinization? While ANT makes certain strides towards including the living nonhuman in networks, I find that these networks of relations are problematically human-centric.

Ontological perspective

So while on one hand it is admirable that ANT looks to the nonhuman with the notion of allowing them to be actors in the creation of a world, Lee & Brown suggest that, problematically, the ascription of actant to non-social entities occurs through a liberal-democratic framework (1994). Whether or not engaging with this framework was a measured move at the beginnings of the ANT movement, Lee & Brown (1994) argue that this focus has actually hampered the ability of ANT to engage with concepts of otherness:

In the context Latour provides (a discourse of liberal democracy), a challenge to the reasoning behind the enfranchisement of the nonhuman

collapsed into the nonhuman actor. I find it slightly amusing (and ironic) that for all the pages that have been written about the attempts to create spaces where the human and the nonhuman exist (and the inability to distinguish the one from the other), nature and animals, as a theme, still exists.

is rather risky, because if we endorse the principal of equality (and who would not dare to, in principle), we must then be prepared to apply it with fear or favor [sic], or accept that we are prejudiced. (Lee & Brown, 1994, p. 776)

Problematic, then, of an ANT perspective is its ability to interest (to deploy some ANT vocabulary), or sweep up, everything that is *not* human. Through Lee and Brown's work, I came to realize why I was uneasy with ANT. Because of its ascription of equity or rights through liberal democracy, the perspective polarizes the way in which it sees the world, such that all objects need to be considered as *equal*. Laurier & Philo write that in ANT, "the nonhumans are in effect 'levelled up' to the status of humans, and the humans are 'levelled down' to the status of nonhumans" (Laurier & Philo, 1999, p. 1060, as cited by Castree, 2002) creating, in turn, homogenized actants. I've been uneasy from the beginning with this aspect of the ontology behind ANT, and now, having this pointed out I understand why. My own perspective on why the nonhuman needs to be seen as equal comes not from the political, from the expansion of liberal democracy, but rather, from a basis of multi-centrism (Weston, 2004) and integral worth, which is a different philosophical perspective. So, questions now arise: Is everything equal, as ANT would appear to suggest? If I believe in value and worth emanating from difference rather than homogeneity, am I able to reconcile the differences that appear to underlie an ANT approach and my own philosophical alignment?

Human exceptionalism & the colonization of the other

In attempting to answer the question "Is everything equal?" that I posed above, Callon & Law suggest that ANT may hold too-strict a definition of what gets to count as action and in turn, what gets to count as actant. They suggest that the "agents we tend to recognize are those which perform *intentions*...those which use a *language*." (1995, p. 503, authors' emphasis) Their critique is of the logo-centric bias that exists when it comes to recognizing action. Given that at best partial perspectives (Haraway, 1991) are what we know, the suggestion that language is the measurement by which all others are to be judged (and, seemingly, humans pre-judged and exempted from future evaluations) is too much of a solipsist's approach to agency for me. It seems as though that we, as

humans, have a hard time appreciating *difference* and in turn, allowing for distinctive characteristics *other* than language to factor into our decisions about agency.

Having just spent three days birding, I'm acutely aware of the agency that, for example, leaves possess. Here are two examples: First, throughout the mornings and afternoons spent looking for migrants, my eye was drawn on a number of occasions to a fluttering leaf momentarily masquerading as a Yellow Warbler. Secondly, birds were also often heard but not seen, masked by their relative location to me and the tree's canopy of newly-emerged leaves.



Figure 1: An example of the kinds of (not-so-great) views I got while birding this spring. This is a photograph taken at Point Pelee of a (unidentified) warbler (silhouetted, mid-right) in the branches of a soft maple.

It was an exercise in patience then, hoping that the various agents (the warbler, the leaves and the branches) would come together in such a way that I would be able to get a view. At these times, I felt as though I had no real control in my need to see the hidden bird. In these cases, action and agency is, in fact, exercised by the bird and the leaves. I believe that moving beyond a perspective of human

exceptionalism by, for example, recognizing the actions that leaves take and the agency that leaves hold is important for my work⁹.

Importantly, Callon & Law (1995) suggest that in the ability to recognize our own language skills as unique, we may ignore or simply not be able to see other kinds of action: this is our partial perspective. Rather than creating a homogeneous field of actants, ANT does not (problematically) recognize its own partial perspective. This means that there lies a (potentially vast) field of actions and, in turn actants that are not so much ignored but simply not seen. It is this seeming inability to see beyond that can be described as ANT's *colonization of other*. Authors critical of ANT have offered the suggestion that in the movement to enfranchise others and in its bid to be seen as the only proper representative of this process, a kind of colonization takes place (Lee & Brown, 1994). Law & Singleton (2005) suggest that through this colonization, ANT as a method effectively has blind spots. The metaphysics of presence suggests that not everything can be brought to presence; thus, to bring something forward also means making something absent (Law & Singleton, 2005). They suggest that ANT only offers a partial view and yet, problematically, demands to be acknowledged as offering a panorama.

How can you make decisions?

ANT seems to offer a different way for a researcher to engage with the sociality of the human and nonhuman world and the stories told within an ANT framework promises to reveal a more authentic picture of objects and organisms in relationship with one another. These pictures, however, quite often reveal imbalances and difference between the actors within the network. Perhaps, given these imbalances, the next logical step would be to look to the method to offer, in some way, possible solutions. Paradoxically, for a method that seems to be so well suited to expose these inequalities, solutions are nowhere to be found¹⁰ within

⁹ I take special interest in plants (as I think they are often take the background to animals when speaking of nature) and the insights that Hitchings & Jones (2004) share on the “botanical encounter”

¹⁰ Or, as Leesa pointed out in an earlier draft of this Comprehensive paper, that perhaps one can not find the solution that one might want.

these works. Given that ANT informed research can help reveal new realities, it does little to suggest a course of action or solutions for the realities it has helped reveal. Researchers interested in watershed restoration offer the following critique:

So ANT's nature-culture hybridity is at once ontologically satisfying but politically problematic because it does not allow us to make recommendations about whether restoration or more traditional engineering is "better" management even as it rises up the conservation policy agenda. (Eden, Tunstall, & Tapsell, 2000, p. 271)

These concerns point to the notion of networks and questions surrounding their beginning and ending. There are two related problems that emerge: network size and the ability to discover actors. ANT makes the cogent argument that actors are engaged in networks, yet if this argument is carried to an extreme, actors can continue to be included in a particular network, *ad infinitum*. Callon & Law make the argument that "how long the list should be is a matter of taste" (1995, p. 489) but if we are attempting to learn from actors without assuming their *world building capacities* (Latour, 2002) do we not risk making that list too short, or so incredibly long that it loses meaning? This would lessen the utility of ANT as a tool to discover networks and actors. Rather, ANT acts as a spotlight to illuminate smaller parts of larger networks. In order to be useful, investigators need to arbitrarily decide what is a part of and apart from the network.

Problematic is the fact that while the networks of actors at the centre of the investigation's spotlight are easily "seen," as the networks move towards the periphery, they become more difficult to see in the dimming light. I believe that in the majority of ANT case studies, rather than understanding that there is only a portion of a larger network illuminated, the illuminated network is described as being real and the less visible, more peripheral (or *possible*) network is left unilluminated, or ignored. There appears to be, at least, an implicit understanding of this concern, and it becomes visible in the critique voiced by Eden, Tunstall & Tapsell (2000): ANT has difficulty offering a solution to the reality it reveals.

After ANT: the ontological turn & the practice of objects

In my opinion, ANT largest failing is in its tendency to seemingly sweep everything that's not human up into the *nonhuman* category. Out of this propensity come other related critiques: ANT's problematic ontological perspective; human exceptionalism; trouble in defining a network's size; and difficulty in ANT's ability to determine actors & action. While it appears as though ANT, as Thrift (2000) suggests, has become a "major force in the social sciences" (p. 5), I find that, given these concerns, declaring an ANT approach as the best way to conduct research into the social and natural world problematic. If I am to use (portions) of this theoretical approach, I need a different way to engage with nature and society. I am now searching for an approach that holds a fundamentally different perspective of the nonhuman.

John Law and Annemarie Mol are two authors who have grappled with ANT's philosophical underpinnings and offer a different philosophical perspective with which to engage in "*naturecultures*" (Law, 2004c). I call this different perspective the *ontological turn*, which, in short moves away from ANT's focus on the epistemological. Mol writes that:

"Philosophy used to approach knowledge in an epistemological way. It was interested in the preconditions for acquiring true knowledge. However, in the philosophical mode I engage in here, knowledge is not understood as a matter of reference, but as one of manipulation." (2002, p. 5)

In this movement, I believe that I am offered a different way to engage with the nonhuman. If you permit me the leap that Mol suggests, that knowledge is a matter of manipulation, this perspective allows for a new engagement in the way that we conceptualize the non-human. I begin explaining this movement and its implications for my work by offering Law & Singleton's (2005) focus on a concern and limit of ANT literature: the *problem of difference*.

The problem of difference

Difference, as Law & Singleton conceptualize it, is "no longer a matter of different perspectives on a single object but the enactment of different objects in the different sets of relations and contexts of practice." (2005, p. 342) If ANT,

and its epistemological founding saw multiple perspectives of one object, in the ontological turn there are multiple objects. As illustrated in Figure 2, rather than “dialectically jumping between the ideas that reside in the minds of subjects and some objective reality out there” (Mol, 2002, p. 31), as the ANT approach suggests, Mol (2002) believes that it is better to focus on the uncertain *practices* of our daily life that are made of bodies and objects in specific relation and context. As such, there is no real singular, independent, objective reality, rather, there are:

different and valid knowledges that can be neither entirely reconciled nor dismissed, and suggests that knowing is or might properly be, a process that is also decentered, distributed, but also partially connected. The logic of juxtaposition renders it inappropriate, even impossible, to draw things together into singularity. (Law, 2002, p. 197)

I see a lack of singularity as an *extremely important* development, the implications of which will be expanded throughout the last half of this paper.

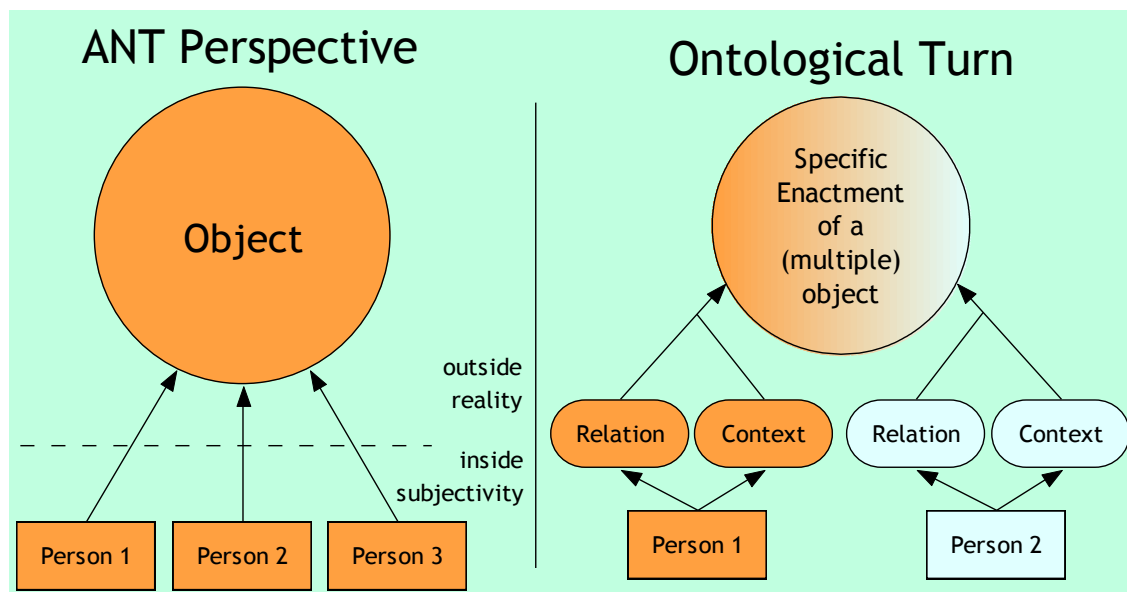


Figure 2: The problem of difference

Objects have gained prominence and importance in my own thinking and work in response to recent work (Law, 2002, 2004b; Law & Singleton, 2005; Urry, 2000) that attempts to look at the ability of social science research methods to engage with what are described as complex and messy objects. As defined by Law & Singleton (2005), objects are treated as patterns of discontinuity between

absence and presence and are less concrete than ever before. Objects are now used to describe the messy, multifaceted and multiple realities that are performed and experienced. Thus, Law & Singleton evoke the metaphor of the iceberg to describe objects: the visible tip represents the immutable attributes of an object, while much more goes on, invisibly, below the waterline. In the ontological turn, the investigation of how objects are performed into being (or how the tip becomes visible) gains central importance.

Objects as appropriate reflections of cultural and social change

While much of this work on objects is academically recent, John Law's 1986 publication can be seen as laying a foundation for the legitimacy of objects as reflections of culture and society that created them. Law's work was concerned with how the Portuguese were able to manage control over long distances during the expansion of their colonial empire in the late 15th and early 16th century. Law (1986) suggests that larger changes in social and technological systems are reflected in the structure of physical artefacts, in this case sailing ships, and if these larger structures are to be understood, we need to look to the ships as offering a legitimate entry to that knowledge (rather than existing merely as artefacts—or passive objects). To this end, Law argues that in sociology, “if one wishes to understand the nature of long-distance control, then it is not only possible but also desirable to talk of people, texts and devices in the same analytical terms.” (1986, p. 256)

In the paper, Law describes the system of navigation used in the North Atlantic and Mediterranean that was amended by Portuguese innovation. Law establishes in this description the understanding that successful “navigation” requires the invocation of a system of heterogeneous elements that, in this particular time, differed from region to region.

What I find interesting about this article is the ability to use the sailing vessel as a metaphor to examine how heterogeneous networks are important for the identity of an object. Law does not provide this kind of analysis directly, but through his description, a ship's integrity as a ship is maintained under a range of circumstances; ships were ships during the medieval system as long as they

stayed within established routes: features, such as water visibility, *marteloio* tables and the magnetic compass, all which defined the ship's envelope of coming and going also limited these ships' ability to go outside the established navigation lanes (which are seen as networks, no doubt). Thus if a ship left these navigation networks, per se, it was at risk of no longer being a ship: in a physical sense, it would lose its integrity as an object if it was destroyed. However, in a theoretical sense, when this ship leaves the known navigation network, it is also in danger of being lost: while physically still a ship the heterogeneous network that previously supported its identity changes.

The idea of maintaining integrity only if operating within an established network leads me to an interesting connection to birding practice. If we imagine birders as following established networks when identifying birds (which are defined by features such as experience, texts, equipment, even visibility) what happens to the birder/what does the birder become when they come across a bird they don't recognize or when they are birding?

In drawing an association to medieval navigation outside of known networks, I think it will be interesting to look at birders as they create (or are created by) heterogeneous relations and when those relations appear to break down. A birder will not be the same birder in every situation: just as medieval navigators would have thought it impossible to navigate in open oceans without the advent of the astrolabe, birdwatchers as they move away from known networks will need to actively reengage other actors to stabilize their own identities.

Modernity, postmodernism, fractional coherence & objects

Objectively (pun intended), objects are *things*: they take up space and they can be touched. This perspective on the nature of objects finds its basis in modernism; that there is an objective world that lies "out there," complete with things that exist and take up space; regardless of their longevity, they are durable and physical. This has been described as a Euclidian version of reality (Law,

2002) where objects take up volume in Euclidean space¹¹; this perspective also invokes a distinctively modern perspective on objects.

In the movement to reject modernity and the turn to postmodernism, the object changes its shape just as the nature of reality changes. No longer is there expert knowledge unlimited in scope, it still remains possible to tell coherent stories as long as the story-teller, as well as the reader, recognize that the reality described is limited in its durability and scope (Law, 2002). Postmodern objects then, if we are to push this perspective to its limits, rather than existing independently on their own, come into existence at particular times and in particular spaces. While they may take up Euclidean space, they are transient, relational and always open to re-creation or disappearance. If modernism represents reality as smooth mirror, then “broken fragments” (Law, 2002, p. 2) represents reality in postmodern thinking. Problematically, these “broken fragments” of post-modernism have been suggested to be “just as much a product of modernism as [modernisms’] own streamlined coherences ever were.” (Law, 2002, p. 2) Thus, in a somewhat ironic turn, postmodernism becomes a mirror to modernism’s approach and in so doing, does not become “the answer” to the problems created by modernism’s singular view.

There is a third possibility, differently described by various authors: fractionality or fractional coherence by some (Law, 2002, 2003a, 2003b, 2004b, 2004c; Lee & Brown, 1994) and multiplicity by Mol (2002). Drawing inspiration from chaos or complexity theory (Urry, 2000), fractional coherence is “about drawing things together without centering them” (Law, 2002, p. 2) where the world “is more than a singularity, but it is less than a multiplicity. It is a fractionality of complex and partially connected space/times.” (Law, 2003a, p. 6) Objects, then, come in different versions and do not need to take up discrete space (Law & Singleton, 2005). Given their fractal nature¹², these versions can

¹¹ I think of Euclidean space as that which we describe using maps, latitude, longitude and altitude: a distinct dot on an X, Y & Z axis.

¹² Again, a turn to mathematics: fractals are distinctly non-Euclidean: lines that exist in more than one dimension but less than two, it is suggested that fractals should be used as a metaphor (Law, 2002) rather than sweating about the details. However, they are distinct from a Euclidean

come together to create a single object, creating what are called “singularities.” (Law, 2002, p. 3) However, the multiple versions can exist simultaneously and create more than one version of the object. Coherence, integral to explanations about the nature of reality in modernism and postmodernism is now not necessary for objects to exist as coherence is not an end-point.

Objects: region, network, fluid and fire

John Law and Vicky Singleton (2005) trace a path through four spatial versions of the object: region, network, fluid and fire. Law and Singleton suggest that objects are seen as regions, networks and as fluids within ANT and after ANT work. Fire objects are offered as another (new) way to think about objects. The network object is the object of ANT and long distance control. It has been suggested that in ANT and post-ANT work, objects have double immutability: they appear to have a stable shape in physical space defined by a dependence on relational and interactive work and are conceptually constituted by a stable structure in a network of relations (Law & Singleton, 2005). In a sense one object is “made up of” physical and conceptual objects that are congruent¹³. No object is ever fixed within an ANT perspective and as such, actors need to constantly work to maintain the network of relations. If objects loose this network of relationships, they loose their “shape” and they “stop being the objects that they were—only some things are fixed, and for a time.” (Law & Singleton, 2005, p. 337)

As outlined earlier, ANT has been criticised for erasing the invisible work that keeps objects stable and, in fact, being active in the deletion of some of those (possible) relations. Additionally, the definition of what is an object has been considered to be too rigid and, in fact, relations that define objects are more unpredictable than originally suggested (Law & Singleton, 2005). To illustrate this point, Law & Singleton point to work completed on a Zimbabwe Bush Pump (de laet & Mol, 2000) where, rather than immutable mobile, the bush pump

perspective as it would be impossible to think of them existing as a *distinct* dot in three-dimensional space.

¹³ In fact, I’m muddying the waters by suggesting that ANT sees the physical and the conceptual objects as somehow being separate.

came to be a *mutable mobile*: “An object or a class of objects [that] may be understood as a set of relations that gradually shifts and adapts itself rather than one that holds itself rigid.” (Law & Singleton, 2005, p. 339) In the case of the bush pump, over time and geographic space, the physical shape of the pump changed due to local need and repairs¹⁴: it has become a *fluid object*. While, on one hand it is still a bush pump through providing a mechanical means to pump water from the ground, each pump differs, perhaps slightly, from others. Indeed, even what is considered clean water changes over time and place: access (or lack thereof) to biological tests of groundwater can change the definition of what is clean (Law & Singleton, 2005). Law & Singleton suggest that whether the pump has a stable set of relations is, in fact, a “moot point.” (Law & Singleton, 2005, p. 338) They suggest that there may be a core of stability (the ability to produce water, perhaps). There may also be no core of stability. Overall, Law & Singleton argue that rather than a core of stability, more important is the “general fluidity of relations that make up the pump.” (Law & Singleton, 2005, p. 338) The implication of this perspective is that in ANT, thinking about objects became too *managerialist*: while the importance of relations was correct, ANT authors became too concerned with standardization and rigidities of immutable mobiles that “if they exist at all, exists within rather specific and rigid networks that try to reach out over long distances and achieve centralized control.” (Law & Singleton, 2005, p. 339) The danger of a managerialist perspective lies in its need to manage and order mess; mess becomes unknowable and in so doing is set aside and ignored (Law & Singleton, 2005).

Fluid objects, while a move in the right direction, are not an end for Law & Singleton. Law and Singleton offer fire objects as a remedy to the concerns of colonization of the other and the *problem of difference*. Fire objects are called such because “fires are energetic and transformative and depend on difference—between (absent) fuel or cinders and (present) flame. Fire objects, then, depend upon otherness, and otherness is generative.” (Law & Singleton, 2005, p. 344) To

¹⁴ It is suggested that repairs are completed with what is at hand, based on need rather than through prescriptive methods.

invoke the idea of a fire object also invokes the concept of *absent presences*. Law (2002) describes the development of a British military aircraft, the TSR2. In this work, Law describes heterogeneity as “...an oscillation between absence and presence...Both/and rather than either/or.” (Law, 2002, p. 96) In the exploration of the development and design of the heterogeneous object known as the TSR2, he discusses the aerodynamic development of the aircraft’s wing and the absent presences of the Russians (who it was assumed were the threat for which the aircraft was developed), the physiological limits of the pilot (such that the wing, designed for low flight would have to be designed in such a way that would make the aircraft manageable for pilot’s body’s limits) and the density of the atmosphere (that would render certain wing designs un-flyable). Law & Singleton put forward the argument that “...we cannot understand objects unless we also think of them as sets of present dynamics generated in, and generative of, realities that are necessarily absent.” (Law & Singleton, 2005, p. 343) While an object is a presence, the implication of this frame of thought is that an object is also an absence: implied in its presence are a set of absences that have given it shape. This, in a sense, give objects a schizophrenic feel. Fire objects are transformative, but not in gentle flows like fluid objects; they take the form of jumps and discontinuities; objects are energetic entities or processes that juxtapose, distinguish, made and transform absences and presences. (Law & Singleton, 2005)

Objects and methods

In their 2005 paper, Law & Singleton treat alcoholic liver disease as an object and as such, investigate the treatment of the disease at a hospital trust in the United Kingdom. While they proposed to map the “trajectory of a patient within the organisation of medical care” (Law & Singleton, 2005, p. 332), this turned out to more difficult to do than they imagined: finding a typical trajectory proved elusive. This caused them to question their project; in turn these questions led them to re-think method.

Law & Singleton (2005) suggest that there were four ways to think about their project’s problems: *the technical, the managerial, the epistemological* and

the ontological. All four of these perspectives have direct implications for the approach to their study subject. The first is the *technical*, best described as the problem of simply not doing “good research.” In their apparent failure to find a typical trajectory, they were simply at fault for not asking the “right” questions. A belief that there are technical problems with the research assumes that there is a “right” answer out there somewhere, left for the researcher to discover. While Law & Singleton did not rule out that there might be a technical problem with their work, they also believed that something else was going on.

The second approach is the *managerial*, a suggestion that the problems lay outside of the control of the researchers, in the hands of the managers of the hospital trust. While this perspective may have been true, invoking it says that it is not possible to know messy objects; that control is out of the hands of the researchers, and only after the mess is cleaned up (by someone else—the manager) can they get a clear view of the problem. At the core of these two beliefs is a call to a perspective where fractal coherence does not exist; messy objects, rather than being a focus of investigation, are symptomatic of something else.

Yet, there remains great possibility in engaging the mess and the final two perspectives can be invoked in the investigation of the messy. The first of these two is the *epistemological*. Law & Singleton describe that objects look messy in this approach because of the belief that “people have different perspective on them.” (2005, p. 333) As a researcher then, you are required to collect as many different perspectives as possible, as in the act of collecting the multiplicity of perspectives, the “real” object behind the interpretation emerges. This perspective, of course, assumes that there is a singular object sitting somewhere ready to be discovered. In comparison to the technical approach, the problem has changed from the inability of the research tool to the inability to collect the proper perspectives required for the object to emerge; the assumption still exists that there is error somewhere in the process.

The final perspective is the *ontological*, where the move is made from multiple interpretations (as implied by the epistemological approach) to thinking about multiple objects themselves. Law & Singleton suggest that this is a move that needs to be made through “an important detour to deal with performativity”

(2005, p. 334) which is to suggest that “realities, messy or otherwise, are *enacted into being*.” (Law & Singleton, 2005, p. 334, authors' emphasis) Prior to carrying this discussion of the ontological perspective forward, I will turn to the notion of enactment and performativity, described by Annemarie Mol and her research method called *praxiography*.

Praxiography

In her 2002 book, Mol explores “ways in which medicine attunes to, interacts with, and shapes its objects in its various and varied practices. Or, to use the technical term: this is a book about the way medicine enacts the objects of its concern and treatment.” (p. vii) In focusing on enactment rather than knowledge, Mol believes that an important effect emerges: what are thought of as single objects may appear to be multiple. Similar to the work of Law & Singleton (2005), Mol suggests that her work is a movement away from epistemology and in that movement it is now important to attend to how the plural enactments are coordinated. Her thesis is this:

It is possible to refrain from understanding objects as the central points of focus of different people’s perspectives. It is possible to understand them instead as things manipulated in practices. If we do this—if instead of bracketing the practices in which objects are handled we foreground them—this has far-reaching effects. Reality multiplies. (Mol, 2002, pp. 4-5)

Mol’s book is, at one level, an investigation of how arthrosclerosis is enacted, or performed. She describes what is required for intermittent claudication¹⁵ to be practiced: a doctor; a patient; worry on the part of the patient; willingness on the part of the doctor; a desk; chairs; the general practitioner¹⁶; the letter. To invoke an ANT perspective, it is obvious that Mol is dealing with actors and networks, however, different from ANT, is her focus on practice. Mol chooses to describe her research method as *praxiology*, which has its roots in ethnography. Praxiology is different from ethnography, as Mol strives to “never [forget] about microscopes.” (2002, p. 31) Meaning, that disease (or,

¹⁵ A symptom of the larger disease

¹⁶ Who makes the referral to the specialist, via the letter mentioned next

the object being investigated) never stands alone in relation to the objects that help enact it. Not just a bodily or human or ethnographic object, rather, it depends on “everything and everyone that is active while being practiced.” (2002, p. 32) In that practice is praxiology.

Thus, atherosclerosis is not *just* the hardening of arteries. It is the interactions of the various actors: a patient, a surgeon, a hospital, a microscope. Mol (2002) calls this enactment, a term that she likes because it leaves the actors vague, suggests that activities take place and that in the act, something is being enacted (Mol, 2002, p. 33). An investigation of disease, which may have been limited to an investigation of a human body, or perhaps even strictly to biochemical balances of blood, cannot ignore the practices through which they are enacted. Thus for a praxiology of atherosclerosis, it requires attending to bodies, places, techniques, technologies. In this attention, the understanding stands that multiple objects can emerge.

For Mol, that which emerged out of her praxiographic investigation of atherosclerosis were a number of different, but related objects: clinical atherosclerosis and pathological atherosclerosis (Mol, 2002), for example. Often these different objects coincide, but they also clash: severe atherosclerosis will sometimes only “emerge” in a patient through a post-mortem. The patient who never suffered symptoms congruent with the disease (and thus never sought out clinical support) will have the disease emerge through the examination of arteries by a pathologist. As Mol describes these two atheroscleroses, “their natures are simply not the same. They are different objects.” (2002, p. 46) Clinical atherosclerosis is not necessarily one object. Without getting into the clinical details, atherosclerosis can be diagnosed through a physical examination or through an interview. These are other enactments, all known as atherosclerosis. Mol suggests rather than atherosclerosis being a fractal object, as Law and others may be want to call it, the term multiplicity describes her own ontological perspective:

So what I am trying to relate is not that there are two, five, or seventy variants of atherosclerosis, but that there is multiplicity. That as long as the practicalities of enacting a disease are kept unbracketed, out in the open, the varieties of “atherosclerosis” multiply. (Mol, 2002, p. 51)

As described above, Mol uses the verb *enact* to describe the processes taking place that bring objects into existence. Earlier, Law & Singleton (2005) use the term *performativity* to describe this ontological turn in the approach to objects. Mol actively chooses to not use the word because of its connections to the term *construction*. The implication with construction is that there is no fixity in the identity of an object and that those identities emerge gradually (Mol, 2002, p. 42). Echoing Mol's philosophy in more general terms, Law describes the nature of the world:

The world is a web of relations. Continuous, discontinuous, configured, ragged. And those relations have no status, no shape, no reality, outside their continued production. This means that the concern is with process. It is with how particular realities get made and remade. And then how they sometimes, possibly often, get themselves embedded so that they become obdurate and resistant. (2004c, p. 2)

Mol writes that “maintaining the identity of objects requires a continuing effort [and] over time [those identities] may change.” (Mol, 2002, p. 43) In this turn, social science has come to investigate the physical nature of objects, traditionally the province of the natural sciences. Importantly, Mol suggests that through this work the dichotomy between (human) subjectivity and (natural) objects has been ruptured, such that nature cannot only be explained by science. Rather, “like (human) subjects, (natural) objects are framed as parts of events that occur and plays that are staged. If an object is real this is because it is part of a practice. It is a reality enacted.” (Mol, 2002, p. 44)

So, to summarize, multiple objects get enacted through actions, places and techniques. Multiple objects can mesh together and coalesce into a singular object. However, that multiplicity does not always mesh: what is seemingly the same object can clash with itself and becomes less than many, but more than one object.

Thinking differently about objects

As outlined earlier in *Critiques of ANT* Law & Singleton suggest that objects in ANT were thought of being too rigid and immobile. Envisioning fire objects, multiple objects or fractal realities opens the possibility for a new way to

think about objects. I must admit that earlier in this paper, I outlined what I felt was a serious fault of the ANT perspective: that the more-than-human world seems to disappear in ANT networks. The want to dissolve nature/culture divides is an admirable goal. However, I wonder if those who are interested in this dissolution have thought enough about what emerges: to its extreme, I fear, the world will appear to be undifferentiated grey goo. There then is some value, perhaps small, in the ability for someone somewhere to label something as more nature or more culture (or more something else, perhaps). What is that value? I believe that switching from an epistemological to ontological perspective allows the multiple objects that exist to emerge: rather than investigating homogeneity, the focus on the heterogeneity of perspectives allows for that mutable and mobile object that Law & Singleton suggest to be discovered and described; importantly context, local knowledge and personal experience become increasingly important in this process. In later work Law offers a crafted version of the object, one that includes representation (to appeal to post-modern perspectives) as well as realism (to appeal, if only partially, to modernity's belief in a fully *knowable* world). Law writes that:

Objects, then, don't exist by themselves. They are being crafted, assembled as part of a hinterland¹⁷. Like representations they are being enacted “in-here”, while sets of realities are being rendered visible out-there, and further relations, processes and contexts that are necessary to presence are also disappearing. Unlike representations, however, objects do not describe the visible realities “out-there”... For objects, then, the relations between the in-here and the visible out-there are complex, contingent and variable, and the traffic may be two-way. (2004b, p. 55)

So, I now have come to the (tentative) conclusion that investigating objects is not necessarily in opposition to my earlier concerns about ANT: I do not have the same concern about the more-than-human world dissolving when examining objects. In fact, I believe that this perspective is more sophisticated as it requires an investigator to focus on the fractal nature of “reality” and attend to difference, bringing these multiples forward rather than collapsing. Researchers also have an

¹⁷ The *Hinterland* is an important idea that I don't mean to introduce here and simply gloss over: I will discuss this important idea below in the section *Method assemblages and hinterlands*.

important hand in creating realities; an important responsibility that I will discuss in more detail in *Ontological politics* section, below. At this time, I believe that it is fair to say that a focus on objects is not a regressive one: it is filled with attention to the many ways that actors, human and otherwise, engage to create a reality: a reality that is described through investigation, a reality that is not the only one “out there,” a reality that focuses on heterogeneity and difference.

Birds as objects?

I have spent some time thinking about hybrids and birds, problematizing the contested space and disappearance of hybrid birds. In engaging an ontological perspective, I believe that a multiple object approach to the question of hybrids will engage with the creation and maintenance of hybrids in a different way than previously possible. Hybrids, I believe, are in fact, a persistent, physical manifestation of fractal objects. Grappling with questions of hybridity goes beyond physicality, and I hope offers an entrance, as Law suggests, to some aspects of the *in-here-ness* of these animals.

Ontological politics

Annemarie Mol (2002) attempts to describe medicine’s ontological politics as “a politics that has to do with the way in which problems are framed, bodies are shaped, and lives are pushed and pulled into one shape or another.” (p. viii) In making the move to multiple realities, she argues that there is a political move being made as well. Complicit with each other, in asking which realities exist out there, one can then ask how the “body [is] multiple and its diseases might be done well.” (Mol, 2002, p. 7) Mol believes that ontology is not “given in the order of things” (2002, p. 6) but rather is actively “brought into being, sustained, or allowed to wither away in common, day-to-day, sociomaterial practices.” (2002, p. 6)

The implication is if multiple realities can be enacted, some might be better than others in answering questions about what we *ought* to do. Not only is it a politics, it is a question of ethics. Law & Urry write that “since every time we make reality claims in social science we are helping to make some social reality or

other more or less real” (2004, p. 396) we have a duty to be asking what kind of social reality we want to be making more or less real. Ontological politics has direct implications for the way that we investigate those realities.

Are current methods “enough” to capture messy objects? Or, After method: implications for method assemblages

Since methods now participate in the assemblage and enactment of reality, selecting a method is not a question of choosing the right tool to best depict “reality.” Now, the questions perhaps should be: What kind of reality ought I be storying or co-creating? What collection of methods allows for the creation or maintenance of the best, or most responsible, or kindest¹⁸ social reality? This section primarily draws on discussions from John Law’s book *After method: mess in social science research* (2004b) and John Law and John Urry’s article *Enacting the social* (2004). Without letting *all* of the cat out of the bag, there is new room for different knowledges, a power and responsibility in the realities that are enacted by the methodology chosen and the implicit understanding that messy objects can exist simultaneously. Research becomes more than an act of simply choosing the “right” method to find the singular reality “out there.”

Law (2004b) writes that we are “caught” in our research methods: in our capture, we do not have the ability to see much of the world. Law suggests that if we want to know such things as messy objects, we are going to have to “teach ourselves to think, to practice, to relate, and to know in new ways...[teaching] ourselves to know some of the realities of the world using methods unusual or unknown in social science.” (2004b, p. 2) The social sciences appear to be relational or interactive: they participate in, reflect upon, and enact the social in a wide range of locations (Law & Urry, 2004). Problematic with traditional methodology is that it is informed by an empiricist view of reality; this perspective assumes, very much like a *region object*, that there is real world

¹⁸ I think that you can insert any kind of adjective into the phrase, but it depends on your philosophical perspective and ethical alignment. Perhaps one could be as easily interested in *the worst, least responsible* and *meanest*. This is, in a sense, where the power now lies in the larger focus of social science research. If we have the power (as it appears we do) to create certain realities, how do we decide which realities to enact and how do we do that?

located in Euclidean space that lays waiting for the researcher to discover (Law & Urry, 2004). As Law & Urry (2004) outline, the implication of this perspective is the belief that if we pose questions of the world, and we gather data in an appropriate manner, we will end up with good knowledge of the social. Rather, Law & Urry (2004) suggest that social science realities are *enacted* (Mol, 2002). In this suggestion they rebuke two common criticisms of a *performative*¹⁹ perspective: the romantic, which implies that we cannot know reality well, and scientific, which implies that there is an ultimate truth beyond the reach of social science methods. Rather, they put forward that in order to avoid this romantic/scientific dualism, while the “real” is “real” (the appeal of the scientific perspective, something that I have always been drawn to), it is made real within relations that are neither relativist nor realist but (importantly) not arbitrary, either (Law & Urry, 2004). What is real is produced in “...dense and extended sets of relations. It is produced with considerable effort, and it is much easier to produce some realities than others. In sum, we are saying the world we know in social science is both real and it is produced.” (Law & Urry, 2004, pp. 395-396)

The implication of the enactment of reality is that methods simply do not “uncover.” Rather, in their relations of investigation, objects are made by methods and if that is the case, research becomes a question of what might be brought into being. Ontological politics at work, then. As previously suggested by work on objects, there is a fractal reality that seems to exist, yet is ignored by traditional social science methods: methods, be they qualitative, quantitative or otherwise, make multiple worlds and “...such worlds might be equally valid, equally true, but simply unlike one another.” (Law & Urry, 2004, p. 397) In basic terms, there is no single “world.” Law & Urry’s (2004) work echoes the move from an epistemological to ontological perspective on objects: rather than multiple perspectives on one world, the world itself is multiple. Law & Urry (2004) conclude that current social science methods deal poorly with:

¹⁹ Which, in some ways, can be seen as being related to, but preceding the concept of *enactment*. Mol (2002) discusses these differences and decided to use the term *enactment* in her work. Law & Urry (2004) are making reference to this discussion.

- The fleeting (here today, gone tomorrow, back the day after tomorrow)
- The distributed (that is to be found here and there but not in between, or that which slips and slides between one place and another)
- The multiple (that which takes different shapes in different places, with the non-causal, the chaotic, the complex)
- The sensory (that which is subject to vision, sound, taste, smell)
- The emotional (time-space compressed outbursts of anger, pain, rage, pleasure, desire, or the spiritual)
- The kinaesthetic (pleasures and pains that follow the movement and displacement of people, objects, information and ideas)

As such, I see it as a challenge to attempt to include these kinds of knowledge in my work. In order to do so, I will need to spend some time thinking about method and just how I plan on engaging these different ways of knowing. Helpfully, John Law (2004b) has given this some thought.

Method assemblages and hinterlands

Law writes that we have to teach ourselves new ways of thinking, practicing, relating and knowing the social. This then calls for, first, a discussion of methods and their (often invisible) ability to enact realities and second, a need to acknowledge the act of *othering* that takes place within the act of research. Law, however, does not offer a simple discussion about conducting research and using method. Associated with notions of the enactment of realities, multiple objects and the turn from epistemology to ontology, Law writes that method is better thought of as *method assemblages* and in so doing, an associated term is introduced, that of the *hinterland*. Law defines method assemblage:

If new realities “out-there” and new knowledge of those realities “in-here” are to be created, then practices that can cope with a hinterland of pre-existing social and material realities also have to be built up and sustained. I call the enactment of this hinterland and its bundle of ramifying relations a “method assemblage”. (Law, 2004b, p. 13)

The hinterland and method assemblage are intimately linked. Law (2004b) argues (in a similar fashion to Law & Urry) that method does not simply act as a tool to innocently discover and show reality, rather methods participate in realities’ enactment (Law, 2004b). This can be seen in the work completed by

Mol (2002), where different medical departments had their own different methods, skill levels and practices. Law suggests that in this research, the hinterland is “...the X-ray machine; the dyes; the catheters; the lead screens; the surgical incision; the antiseptics; the sedated patient; the table on which he lies; and a whole lot more.” (Law, 2004b, p. 48)

As I sit and read about this hinterland, the conceptual influence of *networks* and *actors* from ANT is obvious. In an investigation about arteriosclerosis, all of these objects have the opportunity to be included in the work; they could be enacted in different networks into a different arteriosclerosis. However, as I have noted earlier, a concern with ANT is the disappearance of the other. Hinterlands are an attempt to engage with this act of othering. Law puts forward that a method assemblage creates three kinds of hinterlands. The first, he suggests are “in-here objects” (Law, 2004b, p. 55); the second are “visible or relevant out-there contexts” (Law, 2004b, p. 55); and the third are “out-there processes, contexts, and all the rest, that are both necessary and necessarily disappear from visibility or relevance.” (Law, 2004b, p. 55) It is worth making special note of the fact that Law explicitly includes that which (necessarily, perhaps) disappears. Emerging is a relationship with the unknown, or the other; I see this as a reaction to an earlier criticism of ANT networks evoked by my spotlight metaphor: in alluding to the fact that there is a limit to that “vision” and even further, that actors in a network might even be othered within the spotlight, method assemblages can be created that might be able to enact another relationship, one that allows the boundaries to be differently delineated and others (or another network) to emerge.

It follows that method assemblage is also about the crafting and enacting of boundaries between presence, manifest absence and Otherness. These boundaries are necessary. Each category depends on the others, so it is not that they can be avoided. To put it differently, there will always be Othering. What is brought to presence—or manifest absence—is always limited, always potentially contestable. How it might be crafted is endlessly uncertain, endlessly revisable. Normative methods try to define and police boundary relations in ways that are tight and hold steady. An inquiry into slow method suggests that we might imagine more flexible boundaries, and different forms of presence and manifest

absence. Other possibilities can be imagined, for instance if we attend to non-coherence. (Law, 2004b, p. 85)

Conversely, Law is also saying that if a statement appears to easily correspond with reality *out-there* it is due to the (effective²⁰) othering of the assemblage that created it. Importantly, Law is not suggesting that research is an act of the imagination²¹—picture another reality and it will appear—rather this perspective requires an understanding (or at least an agreement) that objects are enacted, reality multiple and more than one story may exist at once. Rather than imagination, the allegory is presented as a way to engage with this conceptual perspective. Law believes that allegories are filled with ambivalence and ambiguity; realities do not have to fit together easily (Law, 2004b) and this non-coherence is the (helpful) nature of reality; anticipating a “single smooth reality” (Law, 2004b, p. 92) does more to cover the hinterland than it does to discover it.

If method assemblages are a “...continuing process of crafting and enacting necessary boundaries between presence, manifest absence and Otherness” (Law, 2004b, p. 144), research undertaken and methods used are a distinctly political move. If, as Law argues, we are to agree with the notion of the present, the absent and the hidden absent²² the task now becomes one of developing, imagining,

²⁰ Ambivalence about a reality, in fact, suggests that the process of othering is not complete or not wholly effective; other assemblages exist that contest it's claim to *reality*.

²¹ However, to be ambivalent, and to subscribe to the tenants of this perspective, Law does later suggest that imagination and narrative have a place in method assemblages. He offers the example of the Australian aboriginal creation story as a kind of method assemblage. He is making an important distinction about reality: that it often defined within Euro-American practice. It also means that as we (including myself in the category of Euro-American) need to address and include different cosmologies and metaphysical perspectives in our work and beliefs on the nature of reality. Ultimately what this means is the need for a better understanding and acceptance of ambivalence and difference in methodology and method. Thus, I think that context is exceedingly important; it does not make sense to *other* imagination as reality if it is congruent with a cosmology that ascribes it different status.

²² I would deploy an artistic metaphor of positive space and negative space here: that which is *present* is the positive space of an image, that which is *absent* is negative space of an image. The two are related and rely on each other: it is often difficult to decide if it is the negative or positive space that creates the image. Unnecessary to in the creation of the image in the frame, is the *hidden absent*. Perhaps, if I expand the metaphor, the *hidden absent* is that which is not within the frame of the image. Importantly, all that lies outside the frame, while unnecessary in the composition of the image, is only unnecessary because it has been selectively ignored in the composition of the image.

invoking or crafting different method(s) (2004b), one(s) which address (at least) two critiques:

It shows us that research methods as conventionally construed in natural and social science are limited in two important respects. First, they are materially restricted. The idea, for instance, that a garden or a religious ceremony or a game or a meal might be an allegory for, resonate with, and help to craft a particular reality, though just about recognisable from common sense (and a commonplace in an anthropology of symbolism), lies far beyond the limits proposed in standard method. Second, they are also limited because they tend to create and make manifest absences that are taken to be independent, prior, singular, definite and passive and all the rest. (Law, 2004b, pp. 146-147)

So, it seems important to engage with the materiality of the everyday world; not limiting scope to particular *best* practices or practices thought of as *especially representative*. As well, it appears as though special attention needs to be paid to assumptions of “independent, prior, singular, definite and passive” absences. While on the surface this strikes me as a complicated and daunting task, I believe that it is not necessarily my *task* to find absences. In a sense, it seems like a bit of waffle on Law’s part: easy to say, difficult to do. However, as I have thought about Law’s call for method, I have come to draw tentative responses. I have found that Law has made some compelling suggestions: too often research is focused on textual or pictorial representations (2004b, p. 147); limits are set on the “proper” form: the article, the dissertation, the figure. These limits act to *Other* non-traditional forms of expression (Law, 2004b, p. 148); aesthetics, for example: Law believes that beauty is more often treated as a “category error” (Law, 2004b, p. 150) rather than part of the process of creating realities.

In an article concerning enacting what was termed *naturecultures*, Law (2004c) makes specific reference to the work of Ellis & Waterton (2005) on amateur experts and nature. While it is suggested that amateur experts may be interested in naming and knowing species, much in the same way a professional would, amateur experts may be primarily interested in the more-than-human world for other reasons. Law suggests that amateur experts—trout fishermen, in this case—may be more interested in “...the embodied and aesthetic pleasures of fly fishing.” (Law, 2004c, p. 7) I obviously see this perspective as having a direct

relationship to my own work. There is little doubt that part of birds' appeal is their aesthetic value. Additionally, in focusing on the practice of birdwatching, I may find other enactments of embodiment and aesthetics. Interestingly, while Law suggests that for the practice of enacting *naturecultures* in STS “that we should be attending to enactments of nature in practices that have little to do with science or technology” (Law, 2004c, p. 8), I believe that my own work, as well as other work within environmental education has already engaged with a nature that has little to do with science or technology. I would suggest, however, that often²³ environmental education work aligns itself with a reality that is not hybrid: nature is seen to be either an objective “out there” reality or an “in here” creation of some kind; thus environmental education research would be enriched by making this ontological move. As Law (2004c) outlines, I see the suggestions to work to engage with multiple *natures*, to include aesthetics and embodiment as a way of enacting birds and birdwatching and I to not ignoring such things as technology or culture in my work; now comes the challenge to grapple with this call and attempt to integrate these perspectives into my own work.

Implications for my work

I hope that my Ph.D. research and dissertation leads towards (at least) two larger outcomes: the first focusing on ontological politics of birding and the second a reflection on my efforts to respond to Law's call for method. In a larger sense then, while my dissertation *will* be about birds, birding and birders, these actors will act as a focus with which to meaningfully engage with an ontological perspective of the world. In looking at the practice of birding using methodological techniques that will (potentially) enact or create different realities or new perspectives on birdwatching as a practice, the possibility exists to recognize birding as a ragged practice and envision a multiplicity of practices. This act interfaces with the notion of ontological politics: in asking what practices of birding are *good* or which practice *ought* we to be enacting, I hope that this work becomes more than an ethnography or phenomenography of birdwatching

²³ But not exclusively. See McKenzie (2005), for example.

at my chosen research sites. This, of course, means that congruent with my own philosophical alignment, the birds will need to be included as more than just the foci of activity in the work that I undertake.

Currently, I believe that this is where a natural history perspective and an associated philosophical alignment can assist me. For me, an interest in natural history means an embodied engagement with a place and the beings present over time. It involves a personal curiosity about what surrounds; it also engages with the philosophical notion that, generally speaking, the living beings (and their non living support) that surrounds has value and worth. These decisions about value and worth are contextual: what applies as being “good” in one place and time may not necessarily be the case elsewhere. Interestingly, I have found threads of what I would consider a natural history philosophy throughout some ANT work. Callon & Law (1995), in discussing if humans are *like* non humans suggest that while it may be a metaphysical question that is difficult to answer, they do suggest that if it can be decided, it would only occur locally. In so doing, they suggest a methodological point-of-view: that it is “interesting to leave the question of agency open.” (Callon & Law, 1995, p. 483) The connections to the local and to the contextual aspects of agency directly relate to my own ideas about natural history. I do think it is particularly interesting to think that you need to look at each instance to decide what is human and non human; where agency may lie. I also like the attention to specific place and situation. This means that adopting a perspective that focuses on enactment and is informed by ANT and post-ANT perspectives is not incongruent with my own philosophical beliefs about the locus of agency and the possibility of the more-than-human world being ascribed status.

In regards to my second outcome, I see this turn to the ontological as an opportunity to try and enact different realities. In designing method assemblages, I plan to address Law & Urry’s (2004) call to investigate the fleeting, the distributed, the multiple, the sensory, the emotional and the kinaesthetic. Some ideas that I have include:

- Asking birders to keep what would amount to a feelings journal: asking birdwatchers to reflect on their emotional state while birding.
- Asking birdwatcher about the kinaesthetic aspects of birding: identifying bird species by ear; learning to use binoculars; walking to find birds; bodily knowledge of the place where they are birding.

“Mapping the sites” (Law, 2004b, p. 74) seems to be a technique that is used by many of the case studies quoted by Law or completed by Law himself. So, obviously, one of the things that I could do is mapping the sites of birding. In a related sense, I have begun a mapping exercise in developing birding quadrants. I could attempt to try to enact different realities through the use of expression other than speaking, writing or drawing: creating “migration maps” that describe a birder’s yearly movement to watch birds (somewhat akin to bird maps); asking birders to carry a GPS²⁴ while birding and from those tracks, create an image of that movement. I still do like artistic forms of expression, and though asking birders to draw a bird (perhaps their favourite?) as an interesting way to investigate knowledge and attention. I believe that in order to investigate ideas of the fleeting and distributed and the multiple are best enacted through what I would have described as traditional methods, such as ethnography, phenomenography or, perhaps praxiography.

In engaging in the act of birding, and by attempting to include humans and the more-than-human world, I am directly addressing one of Law’s (2004b) concerns with conventional research. In focusing on an *act*, I am already looking beyond these traditional limits. In much of this research, a great deal of the work has been embodied: work on arteriosclerosis (Mol, 2002) and alcoholic liver disease (Law & Singleton, 2005) all occur *within* the body. While I do not want to assume that some part of the relationship between humans and birds is not embodied, I also believe that this work is challenging in its focus on enactments with bodies that take place outside an individual. I do not have an immediate

²⁴ Global Positioning System: device that is able determine latitude and longitude based on the timing signals received from orbiting satellites; developed and maintained by the US armed forces, its use is not without criticism (for its focus on Euclidean space, for example)

answer as to how I will address this challenge, however it is something that I continue to attend to and reflect on.

My research interests now partially lie in the enactment of different objects in birdwatching. Some of the questions that have emerged include:

- What combination of objects, practices and experiences “creates” a birder?
- What creates international birding destinations? or: Why is Point Pelee much more popular than Rondeau?
 - Is birding enacted differently in different places?
 - Are birds enacted differently in different places?
 - Does place say something about how we engage with birds?
- How are birds (individuals, species) enacted?
- How are the birds active (or actors) in this enactment?
- Are some birds ignored by birders?
 - Why are some birds ignored in birding (hybrids & non-native species, for example)?
 - Can those birds be enacted in a different way so that they don’t disappear?
- What are the different ways that people engage with birds?
- Given that there are many different ways to engage with birds (birdwatching, bird banding, ornithology, bird rescue [FLAP]), how do people enact those relationships?

While I believe that there are important questions to answer in the list, it is by no means a focused or exhaustive list. It has been informed by the discourses that I have read while completing this Comprehensive; obvious in it are my previous interests in place and space and environmental philosophy. As I continue forward with my work, I am taking away important beliefs about my research and what kind of alignment and perspective I need to bring to my future project.

Importantly, a focus on ontological politics will shape the questions I ask. In reflecting on the list I have already generated, I can see an ethical alignment already emerging. I plan to pay specific attention to the act of *othering*; while I understand on one hand any method assemblage is active in othering knowledge, and believing that I will ever be able to have a panoramic, or all knowing view of my research is problematic, I do think I can be active in shaping what gets othered. Through engaging with different methods, asking different questions, in

focusing on different knowledges, I hope to be able to *at least* include other some objects that would have been otherwise left in the hinterland.

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