

The Ontology of Motion

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We live in an age of movement. More than at any other time in history, people and things move longer distances, more frequently, and faster than ever before. All that was solid melted into air long ago and is now in full circulation around the world like dandelion seeds adrift on turbulent winds. We find ourselves, in the early twenty-first century, in a world where every major domain of human activity has become increasingly defined by motion.¹

We have entered a new historical era defined in large part by movement and mobility and are now in need of a new historical ontology appropriate to our time. The observation that the end of the twentieth century and the beginning of the twenty-first was marked by an increasingly “liquid” and “mobile modernity” is now something widely recognized in the scholarly literature at the turn of the century.² Today, however, our orientation to this event is quite different. Almost twenty years into the twenty-first century we now find ourselves situated on the *other side* of this heralded transition. The question that confronts us today is thus a new one: how to fold all that has melted back up into new solids.³

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This calls for, among other things, a new philosophical ontology. In other words, what does the kinetic nature of contemporary events reveal about the nature of being such that it is capable of producing this sort of present? At no point in history have beings ever been anywhere near as mobile as they are today, so what does this say about the nature of reality such that it is and has been capable of this degree of mobility? If being is defined by the historical primacy of motion today yet existing ontologies are not, then we need a new historical ontology for our time.⁴

The present, however, is not a homogeneous, closed set of things and dates. The present is not a presence but an open process, a site of material and performative struggle. Yet this idea itself of the present as an “open site of struggle” is also a recent historical invention that assumes the mobility of the present to become different than it is.

In the spirit of this larger inquiry, I propose here an introduction to the distinct theoretical tradition of the “ontology of motion.” This is not a term of common usage in philosophy and thus does not yet have a clear definition or a common historical lineage. This essay attempts to provide precisely these things.

The ultimate aim of locating such a tradition is to help provide conceptual tools for developing an inspired but original ontology of motion. In other words, this essay is the first step toward creating a new conceptual and ontological framework based on the historical primacy of motion. The goal of such an ontology is to provide a new description and interpretation of traditional ontological categories and the big historical events of our time.

The Context and Crux of This Intervention

This essay is part of a larger book project, *Being and Motion*, which is itself part of a larger project on the philosophy of motion. I began this project with *The Figure of the Migrant* (2015) and *Theory of the Border* (2016) but soon realized that the original theoretical framework developed there was entangled with similar issues in ontology, art, and science. Just as my research revealed the constitutive role played by social mobility in the form of migrants and borders in the foundation of pre-Western and Western societies, it also revealed

that a similarly constitutive role was played by movement and mobility in the history of ontology, art, and science. In particular, I have been surprised to find such incredible synchrony in the dominant patterns of motion (centripetal, centrifugal, tensional, and elastic), first identified in *The Figure of the Migrant* and now in these other areas as well.

Each of these other areas (ontology, art, and science) has now been treated in its own full-length work. The aim of *Being and Motion*, to which this essay is a historical introduction, is to put forward a robust and systematic historical ontology of motion. The first part of *Being and Motion* provides the methodological framing for the project based on “historical ontology,” “transcendental realism,” “process materialism,” and the “theory of motion.” The second part then uses this method to reinterpret the dominant ontological categories of Western history (space, eternity, force, and time) as fundamentally kinetic structures or patterns of circulation, just as *The Figure of the Migrant* did with the political history of territories, states, laws, and economies. This is the larger context in which the current essay aims to provide an introduction and critical intervention.

More specifically, the crux of the intervention of this essay is two-fold: (1) to provide a historical definition of the ontology of motion, a description of its precursors, and a list of their differences from more widely known process ontologies of becoming, and (2) to state the limitations of both these traditions with respect to the creation of a new ontology of motion. This critical effort is needed for two reasons.

First, the “philosophy of movement” does not have an obviously recognizable tradition or existing body of literature in the way that the philosophies of space, eternal forms, force, and time do. Motion is a traditionally marginalized ontological category. Thus this essay provides what is to my knowledge the first intellectual history of the ontology of motion. In writing this brief history, we will therefore also be able to locate a definition of what the ontology of motion is and in what ways it is different from ontologies of becoming with which it is often today confused. Again, this is necessary because it is

not at all obvious what, if anything, the ontology of motion actually is as a coherent philosophical position or tradition.

Second, the ontology of motion and its inverted twin, the ontology of becoming, both have a number of advantages and limitations that ought to be considered before a new historical ontology of motion is put forward—which I believe it should be, for numerous reasons spelled out elsewhere.⁵

This is an admittedly ambitious project, but if there is any genuine novelty to the events of our time, or any possibility of a new ontology for us today that prompts us to rethink the fundamentally mobile nature of things, then perhaps one of the first steps is to discover its theoretical precursors and distinguish the ontology of motion as its own tradition. In this essay we will look at the broader efforts and methods of studying the primacy of motion, consider what the ontology of motion is in particular (distinct from similar ontologies), and conclude with an analysis of its limitations as well as the next steps toward a new historical ontology of motion today.

The Philosophy of Motion

The philosophy of motion is the analysis of phenomena across social, aesthetic, scientific, and ontological domains from the perspective of motion. As such, the ontology of motion is only one part of the philosophy of motion. Most important, and quite simply, the philosophy of motion is defined by the methodological primacy of motion with respect to the domain of study. Therefore the difference between simply describing the motion of things, which almost every philosopher and even layperson has done, and the philosophy of movement is the degree to which movement plays an analytically primary role in the description.

For example, if we describe a body moving through a space (x, y, z) over a time (t), we are describing motion, but we are also assuming a more primary nonkinetic and immobile space-time within which this motion occurs. From the perspective of motion, however, space and time are not immobile at all, but only relatively immobile patterns of some matter in motion on which another pattern or trajectory is traced. Everything is in motion, but all motions are relative

to others. This is a basic tenet of contemporary physics.⁶ Giving analytic primacy to motion, however, does not mean that we cannot speak of space or time. It just means that motion is a unique dimension of reality not reducible to space or time.

Given this simple and quite general definition of the philosophy of motion, we can already see it at work across several contemporary domains of inquiry to varying degrees.

The Study of Motion

At the most basic level there are a number of domains and subdomains where the *movement* of bodies defines the study of the domain itself, like fluid and nonlinear dynamics,⁷ interactive and generative art,⁸ and migration and transport studies,⁹ to name only a few. If everything is in motion at one level or another, then quite literally everything deals with motion. The difference, however, is how the study deals with this motion. Does it treat its domain of inquiry like static nodes in a network, like abstract numbers, like preserved works of art? Or does it focus almost exclusively on the vectors, oscillations, and circulatory patterns of mobility itself within which people, things, states, particles, proteins, and so on are all metastable aspects of a more primary kinetic process?

In most major domains the study of motion is not the dominant one. The study of motion is often defined solely by the fact that its domain of inquiry deals exclusively with the study of bodies as *movements*. In this sense studies of motion adhere to a kind of regional de facto primacy of motion. Their work is a relevant and important contribution to the philosophy of motion even if such studies take no broader position on the primacy of motion in any other domain. The limitation with such studies, however, is that they are often, although not always, limited to a single domain, subdomain, historical period, or methodology.

The Mobilities Paradigm

In 2006 Mimi Sheller and John Urry announced the emergence of a “mobilities paradigm” or “mobility turn” in the social sciences.¹⁰ Their edited journal issue showed quite dramatically what many scholars studying movement across several disciplines already felt

had been going on for some time. Despite their different domains and topics of study, they were in fact studying the same thing, but from different perspectives: motion. The recognition of a common something that was being studied, despite the empirical differences in the areas of study, was an important event and has led to further expansions of the paradigm into the humanities over the last ten years.¹¹

This event has at least two consequences for the development of a philosophy of motion. First, it takes the study of motion one step further by explicitly expanding the *de facto* methodological starting point of the primacy of motion to multiple areas and topics of study in the humanities and social sciences, including anthropology, cultural studies, geography, science and technology studies, tourism and transport studies, and sociology, to name only a few.

Second, and even more important, this expansion introduced the possibility of a theoretical or methodological unity to the study of motion, as well as the possible limits for such a method. Does this method apply only to studies in which things are obviously, dramatically, and empirically moving around, like tourism, migration, the spread of viral epidemics, portable computers, airports, automobiles, and so on? Or should we still adopt the methodological primacy of motion in cases in which things seem more immobile, like borders, states, prisons, desktop computers, roads, and so on? Or, for those, should we go back to the spatial turn of the 1980s for a different method and set of concepts? Should we still begin our method with the primacy of motion if the events are older than the contemporary event of our “liquid” and “mobile” modernity, as Zygmunt Bauman, Marc Augé, Manuel Castells, Paul Virilio, and others all heralded at the turn of the century?¹² Or, for older events when the world was more static, should we just rely on the traditional static methods of our discipline? There are as many answers to these questions as there are mobilities scholars, but it is easy to see where this is going. The mobilities paradigm extends only as far as scholars are willing to take it. At the moment mobility studies is largely, although not exclusively, focused on more obviously mobile bodies (cars, dance, diaspora, airports, and so on) in the twenty-first, often twentieth, and, occasionally, nineteenth centuries, and mostly in the

social sciences, sometimes in the humanities, and rarely in the natural sciences.¹³

In their description of this mobilities paradigm Sheller and Urry even make clear that they “do not insist on a new ‘grand narrative’ of mobility, fluidity, or liquidity. The new mobilities paradigm suggests a set of questions, theories, and methodologies rather than a totalising or reductive description of the contemporary world.”¹⁴ The mobilities paradigm is, according to Sheller and Urry, not a metaphysics that describes everything forever and for all time.

However, mobility studies often seems arbitrarily limited in its scope and content. At times this limitation threatens to undermine the methodological primacy of motion altogether, as when a binary division is introduced between space-time immobilities, fixities, or moorings, on the one hand, and mobilities, on the other. This is particularly limiting when immobility itself is understood to be the condition of mobility, as when Sheller and Urry claim that “the multiple fixities or moorings . . . enable the fluidities of liquid modernity” or that mobilities “presume overlapping and varied time-space immobilities.”¹⁵ Surely there are relative relations of motion and rest, but, physically speaking, nothing is absolutely immobile. Why then limit the paradigm of movement to the “relatively immobile” in this way?¹⁶

Despite the rather banal empirical fact accepted by every physical scientist that everything is in motion, some mobilities scholars have really dug their heels in on this point, arguing that “if everything is mobile, then the concept has little purchase.”¹⁷ But imagine saying that “since everything is in space or time, the concept has little purchase.” The critique above is preposterous.¹⁸ No wonder so few natural scientists seem interested in the mobilities paradigm. I agree that it is at least analytically useless and at most politically pernicious to *merely* say that “everything is in motion” or “motion is a good,”¹⁹ but that is true of anything. On the contrary, the methodological goal of the philosophy of motion is to give us another robust perspective on reality—with all the same rigor across every domain of inquiry that space and time have had.

Surely there is a third way between a grand metaphysics of motion and the study of some contemporary things that seem to move a lot. Surely it is possible for paradigms and theoretical frameworks to offer a description of everything that has existed without being the

only coherent or reductive description of those things. There can be and certainly are multiple coexisting descriptions of the same things from different perspectives. Why then can't the mobilities paradigm offer us a new perspective or dimension to everything in the same way that we quite easily talk about spatial and temporal dimensions to all things? Movement is just as real an irreducible dimension of being as space or time. There is nothing that is not or has not been in motion. To believe otherwise is precisely to reduce motion to space and time.

A regional ontology of motion can therefore be stretched a long way without impinging on the future or becoming "total," "absolute," or "reductive." In other words, a theory can have a large region and still be regional. Certainly such a theory can be pushed beyond the last fifty years or one hundred years. Everything moves. So why restrict a movement-oriented theoretical perspective to a couple of domains, or historical periods, or anything else outside the nonexistent future? If something moves, why can't a movement-oriented perspective be used to understand it?

So while the mobilities paradigm has made and continues to make excellent contributions to the philosophy of motion to some degree, it also seems to have set some arbitrary de facto limitations to its domains, historical scope, and content that leave plenty of room for the emergence of a more robust nonmetaphysical and nonreductionist philosophy and ontology of motion.

The Ontology of Motion

The ontology of movement presented here has several important precursors in the history of philosophy and several related contenders in contemporary philosophy. To help clarify the continuity and genuine novelty of a new ontology of motion, it is worth considering carefully where it is similar and where it diverges from its precursors and contemporaries.

Historical Precursors

Here I will give only an abbreviated history of the main ideas and contributions of three major philosophers of motion, since elsewhere

I have given each of them a much more careful and book-length treatment.²⁰ Also, I will not provide in this brief history the exact reasons that other philosophers are *not* on this list, because those arguments have been made at length in *Being and Motion*.

LUCRETIUS

The first historical precursor in the ontology of motion is the Roman poet and philosopher Lucretius (ca. 99–55 BCE). Lucretius follows a long line of Greek atomist philosophers from around the fifth century BCE, including Leucippus, Democritus, and Epicurus. According to Aristotle, one of the primary ontological tenets of atomism for Leucippus and Democritus is “that there is always motion.” With the exception of Parmenides, in fact, all the pre-Socratic philosophers accepted the thesis of continuous motion. However, not all of them accepted that this motion was ontologically primary. Leucippus, Democritus, and Epicurus alone affirmed the ontological primacy of movement without a static, eternal, or first origin. “The atoms,” Epicurus writes, “move continuously for all time.”²¹ Their movement has no origin and no end, no God and no immortal soul. There is only matter in motion. There are no static phenomena to appear to a stable observer but only *kinomena*, or bodies in motion. All of being is produced by a curvature in the flows of this motion that subsequently generates a series of spiral vortexes that appear as solid discrete material. Stability and stasis are therefore products of a more primary vortical movement.

However, the difference between Lucretius and the earlier Greek atomists is precisely that—the atom. For Leucippus, Democritus, and Epicurus, atoms are always in motion, but the atom itself remains fundamentally unchanged, indivisible, and thus internally static. Instead of positing discrete atoms as ontologically primary, as both ancient Greek and later modern theories do, Lucretius posited *the movement or flow of matter as primary*. Although the Latin word *atomus* (smallest particle) was available for Lucretius to use in his poem, he intentionally *did not use it*, nor did he use the Latin word *particula* (particle) to describe matter. The English words *atom* and *particle*, among others, have been added to the text based on a certain Greek and modern bias. The idea that Lucretius

subscribed to a world of discrete particles called atoms is therefore both a projection of the thought of Epicurus, who used the Greek word *atomos*, and a retroaction onto *De rerum natura*. Instead, Lucretius uses the word *materies* (matters) to describe the continuous and turbulent flow (*flux*) of movement without rest and without space or time (*exiguum clinamen principiorum nec regione loci certa nec tempore certo*).²² No one before Lucretius had ever given such a direct and clear ontological primacy to motion over space and time. He is therefore the prince of motion. Based on this ontological position, he provides a number of shockingly contemporary-sounding theories on physics, epistemology, aesthetics, history, and meteorology. Unfortunately, the one short book we have left from him hardly constitutes a full-fledged ontology.

MARX

The second historical precursor in the ontology of motion is the German philosopher Karl Marx (1818–83). As a young philosopher, Marx was deeply influenced by Hegelian philosophy but was also deeply critical of its idealist and historically determinist character. His first attempt to overcome Hegel and create his own philosophical and materialist philosophy begins in his dissertation “The Difference between the Democritean and Epicurean Philosophy of Nature.” By looking at his notebooks, we can see that this was written alongside his thinking about the nature of matter in Feuerbach and Hegel’s *Philosophy of Nature*.

By returning to Greek atomism, Marx was able to work out the philosophical and ontological foundations of his own philosophy on different terrain. The key discovery of his thesis was that for Epicurus and Lucretius, in contrast to Democritus, matter itself was creative and free in its movement or swerve. This meant that being was not idea but matter, not logically determined but materially free. History was open to a revolutionary communist horizon beyond the Hegelian state. In his reading Marx was also the second to reject the existence of a solid and static atom in atomism, seeing instead its movement as more ontologically primary than its solidity. “The consequence of this [the primacy of the flow of matter] for the monads as

well as for the atoms would therefore be—since they are in constant motion—that *neither monads nor atoms exist*, but rather disappear in the straight line: for the solidity of the atom does not even enter into the picture, insofar as it is only considered as something falling in a straight line.”²³ Based on this early ontological conviction on the primacy of motion, Marx’s work takes on a decidedly historical and material kinetic character—focusing on the mobility of labor and the circulation of capital. He treats labor (and thus society) not as a static thing but as a material “flow” or “motion,”²⁴ which becomes “congealed”²⁵ or “crystalized”²⁶ into commodities that in turn flow, circulate, and congeal into larger and larger social metabolic structures. Therefore one can discern such a historical ontology of motion in Marx’s work only by seeing it, appropriately, in practice here and there as it is put to use.

BERGSON

The third historical precursor in the ontology of motion is the French philosopher Henri Bergson (1859–1941). The legacy of Lucretius’s ontology of motion continued in the young Bergson, who in 1884 published his first book: an annotated edition of Lucretius’s *De rerum natura*. The influence of Lucretius on Bergson is readily apparent in Bergson’s rejection of atomistic and mechanistic materialism as well as the affirmation of the ontological primacy of motion. Instead of fixed states, Bergson describes “fluid masses” in “a moving zone.” “States thus defined,” he says, “cannot be regarded as distinct elements. They continue each other in an endless flow.”²⁷ Nature is “one single immense wave flowing over matter.”²⁸

Despite his numerous comments about a continuum of matter and motion, Bergson is often read as a “vitalist” philosopher or a philosopher of time, duration (*duré*)—and not of movement per se. In other words, all the passages about matter in motion are often read as derived from something more primary: *a vital force* or unquantifiable energy inside all of life that causes it to move or explains its motion. In fairness, Bergson often lends himself to this kind of reading by not always clarifying exactly what this “vital impetus” or “force” is. Other passages still, from *Matter and Memory*, make it sound as if time or “pure duration” were ontologically primary

and doing the flowing and moving.²⁹ In all this it is easy to mistake Bergson's ontology for one of vital force or time.

However, what is less well known is that Bergson clears all this up in his final and most definitive work, *La pensée et le mouvant* (*Thought and Mobility*, 1934)—for some strange reason translated into English as *The Creative Mind: An Introduction to Metaphysics*. With respect to vital force, he argues that it “is known and estimated only by the movements which it is supposed to produce in space . . . [but it is] one with these movements.”³⁰ Vital force, therefore, is not some kind of mystical or ethereal substance or vague energy. It is nothing other than *movement itself*. On the issue of time/duration Bergson writes very clearly in this final work that “time is mobility.”³¹ “Mobility,” Bergson argues, “or what comes to the same thing, duration,”³² is becoming, but becoming is not “becoming in general” as an “immobile medium,”³³ through which things pass. Becoming is the continual mobility of reality itself. “Reality is mobility itself.”³⁴ In this final work Bergson could hardly be more unequivocal and clarifying: “If movement is not everything, it is nothing.”³⁵ Whatever apparent primacy he gave to so-called vital force/impetus or time/duration should now be understood as *nothing other than the primacy of motion itself*.

This wonderful book gives us a way to return to and rethink many of Bergson's previous works on time, mind, and vital force with respect to the absolute primacy of mobility. It is unfortunate that it was so late in his life before he was able to explicitly and systematically identify duration and the *élan vital* with movement itself.

LIMITATIONS

All of these historical precursors have their limitations: we have only one short book from Lucretius, Marx did not write an ontology, and Bergson came late to the explicit ontological primacy of motion. In some sense, Marx is the most limited, since he does not explicitly put forward anything like a systematic ontology. In another sense, however, Lucretius and Bergson are even more limited, since their ontologies are not nearly as historical as an ontology of motion would require. Unlike Marx's more historical methodology, which takes place explicitly under the regional and historical conditions of

nineteenth-century industrial capitalism, Lucretius and Bergson offer universalist-sounding accounts.

A new ontology of motion, however, would be an inspired but different project that sought to overcome both the ontological and the historical limitations of these precursors by writing a historical ontology and an ontological history of motion. This is something none of these precursors do. Any new ontology of motion thus owes a great debt to these figures but must also move beyond their limitations in its own way.

Process Ontology and Becoming

The historical precursors of the ontology of motion have also had a major influence on a number of contemporary process ontologies, or ontologies of becoming. Process ontology, like the ontology of movement, emphasizes flux and becoming but is not necessarily identical to the ontology of motion. There can be all kinds of flux: flux of time, flux of space, flux of force, and so on. The ontology of motion is strictly the flux of matter. All other fluxes are nothing but the flux of matter: motion. Time, space, and force do not transcend matter in motion. Space and time are dimensions of reality, but they are irreducibly material kinetic dimensions.³⁶ It is easy to see how the two are connected but important to see where they diverge.

WHITEHEAD

One of the first major systematic process philosophers was Alfred North Whitehead (1861–1947). However, a whole other set of historical precursors could be drawn up, which would likely include Heraclitus, Duns Scotus, Spinoza, Nietzsche, Leibniz, and others. For Whitehead, process is real, but continuous change and motion are not. For example, according to Whitehead, change is only “the difference between actual occasions comprised in some determined event,” and thus it is “impossible to attribute ‘change’ to any actual entity.”³⁷ “Thus an actual entity never moves: it is where it is and what it is.”³⁸ Change and motion thus relate to a succession of actual entities and are constituted only by the *differences* among them. Every entity is simply “what it is,” and it “becomes” as the whole of reality enters a succession of different states, but no entity ever

technically changes or moves. At least one scholar has aptly observed that this is a purely logical kind of change, or what has come to be known as a “Cambridge change,” after the school of logicians Whitehead worked with, and not a kinetic one. Whitehead’s transition, the same scholar observes, “is not a real transition, not a flow or flux, and change so understood is merely a fact consequent upon the successive existence of a series of different unchangeable and static actual entities. *The very notion of change has been made incurably static.*”³⁹ If there were still any doubt on this matter, Whitehead quite clearly writes in *The Concept of Nature* that “motion presupposes rest. . . . A theory of motion and a theory of rest are the same thing viewed from different aspects with altered emphasis.”⁴⁰ There is “no continuity of becoming,” Whitehead says, but only “a becoming of continuity.”⁴¹ This is the direct inverse of Bergson’s claim that immobility presupposes mobility and that everything is in motion. So here we see that process ontology can be quite different from an ontology of motion and can even eliminate motion entirely and still be considered a process ontology of becoming.⁴²

DELEUZE

Gilles Deleuze (1925–95) is the philosopher of process and becoming par excellence. Influenced both by the ontologists of motion (Lucretius, Marx, Bergson) and by the great philosophers of becoming more broadly (Duns Scotus, Spinoza, Nietzsche, Leibniz, Whitehead, and others), Deleuze was the first to unify these two traditions into a vast synthetic and systematic philosophy of becoming. Instead of developing a single ontology limited to a single name for being (space, eternity, force, time, motion, etc.), Deleuze developed an inclusive and pluralistic ontology in which all the great names of being are said equally and univocally of the same being—on the strict condition, however, that this single being be understood as the being of pure becoming or differential process. The ontology of becoming therefore is not a naive and contradictory affirmation of all other ontologies, but a complete reinterpretation of all ontology itself as process, as becoming. Thus Deleuze develops and applies process theories of space, thought, force, time, and motion across numerous domains.

This incredible coup de grâce at the end of the twentieth century gave birth to a number of inspired efforts extending the application of becoming to new areas. Of particular interest are those Deleuzeans like Michael Hardt, Antonio Negri, Manuel DeLanda, Brian Massumi, Erin Manning, Jane Bennett, William Connolly, and Rosi Braidotti who have made a concerted effort to apply this ontology to questions of materiality.⁴³ Even object-oriented ontologists and speculative realists like Levi Bryant, Steven Shaviro, and Didier Debaise have explicitly drawn on Whitehead and Deleuze to theorize a process philosophy of objects and things.⁴⁴ In short, the ontology of becoming has become an extremely fecund starting point for numerous ontologies at the end of metaphysics.

Deleuze's great contribution to the philosophy of movement was therefore to have shown the ontological primacy of becoming over being and the coherence of this minor historical tradition stretching from Lucretius to Whitehead. Oddly, however, for Deleuze becoming means continuum, matter, and motion as equally as it means difference, thought, and stasis. *There is a becoming of both*—hence the division and ambiguity between what is now called “new materialism” and “speculative realism,” both drawing on different strands in Deleuze's work. This split, however, attests to the difficulty and perhaps the impossibility of affirming both becomings equally without falling back into one or the other, or introducing, as Deleuze ends up doing, a third “pure becoming” that traverses them all: force. For Deleuze, there is a “force of thought” just as there is a “force of matter.”⁴⁵ Everything becomes because everything is a force of becoming. He is quite explicit about the ontological primacy of force against Marx's and Lucretius's kinetic materialism (which lacks force) in his book on Nietzsche. “Atomism,” Deleuze writes, “would be a mask for an incipient dynamism.”⁴⁶ This position has at least three important limitations, which, by way of contrast, will help highlight the novel contribution of a new ontology of motion.

Motion

The first limitation is Deleuze's *theory of motion*. If the flux of matter, like every other flux, is ontologically equal to every other flux, then we should expect to find in Deleuze's pluralist ontology of

becoming a pure becoming of motion without stasis, immobility, cut, or break. But in almost every one of his major works we find the opposite.⁴⁷ He nearly always ends up reintroducing stasis or immobility into his definition of motion.

For example, in *Difference and Repetition* Deleuze explicitly subordinates movement to time: “The [third] synthesis is necessarily static, since time is no longer subordinated to movement; time is the most radical form of change, but the form of change does not change.”⁴⁸ In *Logic of Sense* the subordination of movement and matter to time is explicit in his theory of “an empty form of time, independent of all matter.”⁴⁹ Accordingly, the whole of chapter 16 is dedicated to what he calls “static ontological genesis,” and chapter 17 to “static logical genesis.” In *Anti-Oedipus* he and Félix Guattari frequently describe society as an “immobile motor”⁵⁰ and even define the concept of “flow,” taken from Marx, as continually “broken up,” “interrupted,” or “cut.” “Every ‘object,’” they say, “presupposes the continuity of a flow; every flow, the fragmentation of the object.”⁵¹ In *A Thousand Plateaus* they even write, “It is thus necessary to make a distinction between *speed* and *movement*: a movement may be very fast, but that does not give it speed; a speed may be very slow, or even immobile, yet it is still speed.”⁵² Hence the nomad’s “motionless voyage.”⁵³

These quotes are not rare aberrations in his texts. Nor by citing them am I trying to introduce some clever interpretation. Deleuze explicitly and consistently describes motion in terms of stasis—reminiscent of Whitehead. Speed, time, stasis, and difference are each explicitly given ontological primacy over motion. Therefore, in Deleuze’s pluralist ontology of becoming, motion all too often resides unequally alongside the other kinds of flux. This does not mean that Deleuze clearly privileges immobility over motion in every case, just that despite all he says about continuous motion and the “movement” of becoming, he consistently includes in it stasis, breaks, and immobilities whose existence is ultimately incompatible with the ontology of motion. On the plane of motion everything moves continuously. Stasis cannot be introduced without dividing the continuum. Thus, at the least Deleuze’s theory of motion is extremely uneven and fractured, and at the worst (from the vantage of an ontology of

motion) it is explicitly subordinated to stasis, time, immobile speed, vital force, and other such attributes. A similar issue occurs in the secondary literature, especially those following in the same Spinozist tradition.⁵⁴

Matter

The second limitation of Deleuze's ontology of becoming is his *theory of matter*. If motion is the flux of matter, then Deleuze's pluralism must also be able to show at least an ontological coprimacy or immanence of matter to the other fluxes. Again, this is not what he does. In *What Is Philosophy?* Deleuze and Guattari define philosophy not as the movement of matter but as an "infinite movement of thought" that lays out a philosophical "plane of immanence" and populates that plane with concepts through a "finite movement of thought."⁵⁵ These various movements of thought lay out philosophical planes defined not by material beings and things but by an "extraction of events from things and beings," and by giving an ontological description of being as "space, time, matter, thought, and the possible."⁵⁶ In short, philosophy has always given a name to being and so "handed over immanence to Something= x " and thus mimicked the discovery of something transcendent.⁵⁷

However, according to Deleuze, the ontology of becoming is "THE plane of immanence, [which] is, at the same time, that which must be thought and that which cannot be thought. It is the non-thought within thought. It is the base of all planes, immanent to every thinkable plane that does not succeed in thinking it."⁵⁸ *The plane of immanence cannot be thought, since it is the infinite movement of thought itself that thinks all the other planes.* According to Deleuze and Guattari, this plane was first discovered by Spinoza, "the Christ of philosophers." Substance, for Spinoza, is one, but it has an infinity of parallel and ontologically coprimary attributes, including thought and matter. However, Spinoza is also quite explicit that thought is the only attribute that can think its own plane and all the other planes. "By attribute I understand *what the intellect perceives of a substance*, as constituting its essence [*quod intellectus de substantiâ percipit*]."⁵⁹ Therefore, even though Spinoza's attempt to make thought and matter ontologically equal, and thus not reducible to

one another, is radical, there remains a fundamental inequality between them if only one of those attributes can reproduce all the others. This is a well-known issue in the scholarship.⁶⁰ In his book on Spinoza, however, Deleuze passes over this fraught issue all too quickly: “The intellect only *reproduces* objectively the nature of the forms it apprehends.”⁶¹ Deleuze thus makes clear, against other commentators, that thought does not create matter and the other attributes. It just objectively reproduces them all in a way that they cannot do themselves. Thus one inequality (subjective idealism) is thrown off only to reveal another (speculative idealism).

From his first book to his last, Deleuze grants a similar ontological primacy to what he calls “the image of thought.”⁶² Thought, for Deleuze, following Spinoza, is just one plane of becoming among many, but, more important, it is also the only plane capable of thinking its own plane and *the* plane that is “the base of all planes” (matter, space, time, possibility, etc).⁶³ Again, this is not an interpretive discovery of a hidden meaning in the text. Deleuze and Guattari are explicit about this: “Spinoza *thought* the ‘best’ plane of immanence—that is, the purest.”⁶⁴

Strangely, then, Deleuze and Guattari’s description of the “infinite movement of thought” that defines philosophical practice must be understood as a kind of pure motion without matter—an oddly abstract, ideal, and “purely formal motion,” as Marx would say.⁶⁵ If ontological practice had even the smallest bit of materiality to it, it could not be an infinite and objective survey or reproduction of *the* plane of immanence that thinks all the planes as their unthought presupposition.⁶⁶ Rather, it would have to be productive, positional, and kinographic.⁶⁷

History

The third limitation of Deleuze’s ontology of becoming is his *theory of history*. Deleuze’s thesis that being is becoming is an explicitly ontological claim, even if it sounds paradoxical. The claim that *the* plane of immanence is the base of all the other planes is not just a regional or historical claim about all previously invented planes but about *all planes* past, present, and future. Just like Spinoza,

thought, for Deleuze, stretches out and surveys infinitely across itself and all the other planes without limit. This is possible because thought is freed of any materiality that would connect it to practices of inscription and thus history. However, ontological practice, or “thought,” for Deleuze is not outside history but immanent with all of history: past, present, and future. “But if it is true that the plane of immanence is always single, being itself pure variation, then it is all the more necessary to explain why there are varied and distinct planes of immanence that, depending upon which infinite movements are retained and selected, succeed and contest each other in history.”⁶⁸ In other words, there is only one pure plane of becoming forever and for all time, which only thought can reproduce, but which is *thought of* differently depending on the historical and geographic circumstances. “History,” for Deleuze and Guattari, is thus simply the “set of conditions . . . from which one turns away in order to become, that is to say, in order to create something new.”⁶⁹ “Philosophy is becoming, not history,” they say; “it is the coexistence of planes, not the succession of systems.”⁷⁰

Deleuze and Guattari are right to reject a simple succession, dialectic development, or deterministic evolution of historical ontologies, but this does not necessarily mean that all ontological descriptions coexist forever and for all time. How could they coexist, for example, before they were historically invented by humans? There was no Platonic description of eternity even 4 million years ago, much less 4 billion years ago. Ontological practices are created in history, not discovered on a speculative plane of becoming. Only after they are created in history can they coexist, and mix with other ontological descriptions, as they do today. In practice, postulating the coexistence of future planes adds nothing to philosophical analysis. Furthermore, why say that thought (becoming) is an escape from matter (history) and not that matter is an escape from thought or from itself? Deleuze and Guattari are right that history is not deterministic. But then why does becoming require thought to become other than history? If there is truly an ontological equality of fluxes, then history and matter are fully capable of becoming other than themselves through their *own flux*: motion. Humans are, after all,

matter with the capacity for creating new ontological descriptions and inscriptions. A glimmer of this point is most apparent in *Anti-Oedipus*, their most Marxist book, in which Deleuze and Guattari describe the historical and material conditions of inscription. However, in *Anti-Oedipus* these are understood only as the social conditions of *desire*, to be “turned away from” with the thought of becoming—as is later made plain in *What Is Philosophy?* The plane of matter and its movement through history is thus just another plane to be traversed by infinite thought.

LIMITATIONS

The historical precursors of the ontology of becoming also have their limitations: Whitehead’s ontology is completely static and ahistorical, while Deleuze’s is more nuanced but ultimately limited by its theories of stasis, thought, and becoming. Both philosophers provide robust theories of becoming, but *neither provides an ontology of motion*. Deleuze says that all fluxes are ontologically equal, but motion is continually cut up and mixed with stasis.⁷¹ Unlike the planes of space, force, and time, which do not seem to pose a contradiction when combined, the planes of stasis and motion pose an explicit contradiction at the heart of Deleuze’s philosophy. He says that philosophy is a “movement” of thought but then abolishes this same movement by purifying it of all matter with the Spinozist thought of *the* pure plane of becoming. He says that thought is not outside history but then claims that all planes past, present, and future coexist and become only by turning away from history.

Thus, despite the ontological nature of their claims, Whitehead’s and Deleuze’s philosophies fit very much with the twentieth-century Einsteinian paradigm, which prevailed publicly well after it had been disproved by Hubble: that the universe was absolutely static but internally and spatiotemporally dynamic. The universe is immobile but creative and becoming. It is an ontologically “motionless voyage.” Today new discoveries in cosmology, quantum gravity, and other fields render visible the dated and historical nature of such claims, but they also set up new conditions that force philosophy to create a new historical ontology for the twenty-first century.

A New Ontology of Motion

In this light, a new ontology of motion should be viewed as a complete inversion of the ontology of becoming. But, like Marx's inversion of Hegel, or Lucretius's inversion of Plato, the inversion is also a transformation. The ontology of motion is not a simple *ontological* inversion that merely positions the continuous becoming of motion and matter as more primary than the becoming of difference, stasis, and thought. Nor does the primacy of motion reject the existence of relative stasis or thought itself. In turning process ontology right side up with its mobile feet on the ground, all becoming is rendered fully material. Stasis becomes an eddy or vortex of flows. Thought becomes a coordinated rhythm of self-affective matters immanent to the bodies, brains, tools, and so on that compose them. Most important, ontology becomes historical ontology, grounded in the material conditions of its time.

Just as Marx extracts a "rational kernel" of the dialectic from the "mystical shell" of Hegel's speculative philosophy, which results in a new historical materialist dialectic, so a new ontology of motion extracts from the speculative ontology of becoming the "rational kernel" of flux, resulting in a new historical materialist ontology.⁷² The methodological primacy of motion therefore is not a strictly ontological claim about being qua being or even being qua becoming, but a historical ontological claim about becoming qua history. What we know now is that everything is in motion. Einstein, Whitehead, and Deleuze were wrong in certain ways not because they made ahistorical claims about the nature of becoming (which they did) but precisely because their claims *were historically limited* in certain ways that they could not see beyond and that are only now apparent to us. The same will likely be true of the ontology of motion at some point. This is what makes it a properly *historical and regional ontology*.

All the other great names for being past, present, and future do not coexist in a pure becoming, but only those that have been historically invented so far coexist and mix together, and only with respect to the material kinetic conditions of the present conjuncture. Furthermore, all previous claims to transcendence are not "illusions," as Deleuze says, contrasted with the true plane of becoming, but

are all real dimensions of the kinetic present. The analysis thereof constitutes a new historical ontology of motion.

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Notes

1. This is an ambitious claim and requires more than the few paragraphs I have offered to prove. In fact, each area (politics, science, and art) requires its own book-length argument showing the historical and contemporary importance of motion. I have already published two books on the politics of movement and completed drafts of the books on aesthetics and science. In one sense *Being and Motion* should be read first because it contains the kinetic-theoretical framework in its most general conceptual formulation, but in another sense it should be read last because its inquiry is motivated by the contemporary events described in the other works.
2. Augé, *Non-places*; Castells, *Rise of the Network Society*; Giddens, *Consequences of Modernity*; Harvey, *Condition of Postmodernity*; Jameson, *Postmodernism*; cf. Thrift, "Hyperactive World"; Merriman, "Driving Places"; Merriman, "Marc Augé on Space, Place and Non-place"; Rosa and Scheuerman, *High-Speed Society*, 1–29.
3. This is a big claim, and I cannot do full justice to it here, but I have argued for it at length in Nail, *Figure of the Migrant*; Nail, *Theory of the Border*; and Nail, *Being and Motion*.
4. To be clear, the age of mobility described here is not defined by or identical to modern capitalism. It is true that capitalism functions by circulation, but it more specifically functions by capturing and temporalizing moving bodies into crystallized quantities of labor-time: commodities. Time therefore remains of more primary importance to the specificity of the capitalist mode of production. Motion, on the contrary, remains more primary and defining for the migrant, whose

living movement is the more primary process that gets temporalized and commodified by capital in the first place. Capital is parasitic on migrant labor just as time is parasitic on motion. See *Being and Motion*, chap. 34, for a full discussion of the relation between time and motion with respect to capitalism.

5. Nail, *Being and Motion*.
6. This may sound like a bold thesis, but in the early twenty-first century it is almost universally accepted by all physicists in quantum field theory and cosmology. See Carroll, *Big Picture*; and Rovelli, *Reality Is Not What It Seems*.
7. See Prigogine and Stengers, *Order out of Chaos*; and Strogatz, *Sync*.
8. See Scott Draves, *Electric Sheep* (scottdraves.com/sheep.html); Bolognini, *Programmed Machines* and *Collective Intelligence* (www.bolognini.org); and Maxime Causeret, *Order from Chaos* (vimeo.com/196269431).
9. For a great bibliography of work on migration, transport, and tourism, see Sheller and Urry, "New Mobilities Paradigm"; and Endres, Manderscheid, and Mincke, *Mobilities Paradigm*.
10. Sheller and Urry, "New Mobilities Paradigm."
11. For an excellent literature review and collected volume on the latest expansions of mobility studies, see Endres, Manderscheid, and Mincke, *Mobilities Paradigm*.
12. Bauman, *Globalization*, 87; Augé, *Non-places*; Castells, *Rise of the Network Society*; Virilio, *Speed and Politics*.
13. Most mobilities philosophies or "methodologies" begin with motion but just as often supplement this with theories of space from Edward Soja, Henri Lefebvre, or David Harvey, or theories of time from Martin Heidegger and Virilio, or theories of affect from Deleuze and Guattari.
14. Sheller and Urry, "New Mobilities Paradigm," 210.
15. Sheller and Urry, "New Mobilities Paradigm," 210. See also Graham and Marvin, *Telecommunications and the City*.
16. Peter Adey and Peter Merriman have also taken issue with this binary opposition between mobility and immobility. See Adey, "If Mobility Is Everything It Is Nothing." In reply to this opposition, Adey suggests that as "everything is mobile" and "there is never any absolute immobility," "moorings are indeed mobile too," but at a more fundamental level Merriman argues that the mobility/moorings binary is too simplistic. See Merriman, *Mobility, Space, and Culture*. This is also a concern of Bissell, "Narrating Mobile Methodologies."
17. Adey, "If Mobility Is Everything It Is Nothing," 76.

18. It is also wrong because space and time are both produced through the folding of quantum fields, which are not reducible to space and time. This is yet another contemporary discovery of the primacy of motion. See Rovelli, *Reality Is Not What It Seems*.
19. For a critique of such simplistic theories of motion, see Cresswell, *On the Move*; and Thrift, "Inhuman Geographies." Although a few feminist theorists such as Rosi Braidotti have embraced nomadic theory/nomadic metaphors, many others have criticized their gendered nature. See Wolff, "On the Road Again"; and Kaplan, *Questions of Travel*.
20. Nail, *Lucretius I*. The books on Marx and Bergson are still in progress.
21. Epicurus, *Letter to Herodotus*, 10.43.
22. Lucretius, *On the Nature of Things*, 2.292–93.
23. Marx, *First Writings*, 111; my italics.
24. "Since labour is motion, time is its natural measure" (Marx, *Grundrisse*, 205).
25. Marx, *Capital*, 128.
26. Marx, *Capital*, 128.
27. Bergson, *Creative Evolution*, 5.
28. Bergson, *Creative Evolution*, 273.
29. Bergson, *Matter and Memory*, 187.
30. Bergson, *Creative Mind*, 53.
31. Bergson, *Creative Mind*, 8.
32. Bergson, *Matter and Memory*, 47.
33. Bergson, *Creative Mind*, 46.
34. Bergson, *Creative Mind*, 46.
35. Bergson, *Creative Mind*, 155.
36. In the case of quantum gravity, this is quite literally true. Dimensionality emerges from matter—not the other way around. This position is more fully developed with respect to space in *Being and Motion*.
37. See Whitehead's theory of change in *Concept of Nature*, 73, 59.
38. Whitehead, *Process and Reality*, 73.
39. Eslick, "Substance, Change, and Causality in Whitehead," 510.
40. Whitehead, *Concept of Nature*, 105.
41. Whitehead, *Process and Reality*, 35.
42. It is well established in the scholarship that Whitehead is a thinker of radical discontinuity, stasis, but also becoming. Since each actual occasion is atomistic and self-contained, and events arise only in the gap or passage between them, there is "no continuity of becoming." See Robinson, *Deleuze, Whitehead, Bergson*.

43. Hardt and Negri, *Empire*; DeLanda, *Assemblage Theory*; Massumi, *Parables for the Virtual*; Manning, *Relationescapes*; Bennett, *Vibrant Matter*; Connolly, *World of Becoming*; Braidotti, *Nomadic Subjects*.
44. Bryant, *Onto-cartography*; Shaviro, *Universe of Things*; Debaise, *Speculative Empiricism*.
45. Deleuze, *Difference and Repetition*, 138; Deleuze and Guattari, *Thousand Plateaus*, 95.
46. In *Nietzsche and Philosophy* Deleuze explicitly subordinates matter and motion to force, contrasting himself and Nietzsche with Lucretius's and Marx's kinetic materialism: "Only force can be related to another force. (As Marx says when he interprets atomism, 'Atoms are their own unique objects and can relate only to themselves'—Marx 'Difference Between the Democritean and Epicurean Philosophy of Nature.' But the question is; can the basic notion of atom accommodate the essential relation which is attempted to it? The concept only becomes coherent if one thinks of force instead of atom. For the notion of atom cannot in itself contain the difference necessary for the affirmation of such a relation, difference in and according to the essence. Thus atomism would be a mask for an incipient dynamism.)" (6–7).
47. There are many places where Deleuze *seems* to be explicitly giving primacy to motion. For example, in *A Thousand Plateaus* he and Guattari write that "only nomads have absolute movement, in other words, speed; vortical or swirling movement is an essential feature of their war machine." Absolute movement is oddly defined both by vortical motion and by speed itself. The nomad seems to be a figure of motion, but just as quickly they clarify this by saying, "It is therefore false to define the nomad by movement" (381). Speed, not motion, is what is most primary here for the nomad. Numerous similar examples can be found throughout Deleuze's work in which motion sounds primary in one passage but is elsewhere contradicted.
48. Deleuze, *Difference and Repetition*, 89.
49. Deleuze, *Logic of Sense*, 62.
50. Deleuze and Guattari, *Anti-Oedipus*, 141, 142, 146, 194, 198, 338.
51. Deleuze and Guattari, *Anti-Oedipus*, 5, 6.
52. Deleuze and Guattari, *Thousand Plateaus*, 381.
53. Deleuze and Guattari, *Thousand Plateaus*, 159, 197, 199.
54. This is why I have chosen to start with Lucretius and not Spinoza. See Merriman, *Mobility, Space, and Culture*, 2–3, for a critique of Erin Manning and process philosophy in which "embodied movement is

repeatedly situated in relation to the privileged concepts of space and time (often as space-time), and the philosophical and scientific orthodoxies which both underpin and provide a departure point for processual and poststructuralist thinking remain in view.” See also Bennett, *Vibrant Matter*, for an example of a similar subordination of movement to vital force.

55. Deleuze and Guattari, *What Is Philosophy?*, 36.
56. Deleuze and Guattari, *What Is Philosophy?*, 33. “The task of philosophy, when it creates concepts, entities, is always to extract an event from things and beings, to set up the new event from things and beings, always to give them a new event: space, time, matter, thought, the possible as events.”
57. Deleuze and Guattari, *What Is Philosophy?*, 60.
58. Deleuze and Guattari, *What Is Philosophy?*, 59.
59. Spinoza, *Ethics*, ID₄; my italics.
60. Martial Gueroult presents a thorough history of this controversy. See *Spinoza: Dieu (Éthique 1)*, 428–61.
61. Deleuze, *Expressionism in Philosophy*, 65.
62. See Hallward, *Out of This World*, for a book-length treatment on Deleuze’s idealism. While I do not agree with all his claims, Hallward provides significant textual support regarding the primacy of “the image of thought” throughout Deleuze’s work.
63. Deleuze and Guattari, *What Is Philosophy?*, 60.
64. Deleuze and Guattari, *What Is Philosophy?*, 60. My italics.
65. Marx, *Poverty of Philosophy*, 78.
66. Followers of Deleuze have also reproduced a similar Spinozist idealism. See Grosz, *Incorporeal*.
67. I am not the first to identify an idealist tendency in Deleuzean ontology. Hardt writes, “Deleuze’s thought, then, appears as idealism on both sides of this practicotheoretical synthesis: a speculative idealism and an empirical idealism held loosely together in one philosophy” (*Gilles Deleuze*, 79). See Bowden, “Paul Redding’s *Continental Idealism*”; Redding, *Continental Idealism*; and Brassier, *Nihil Unbound*.
68. Deleuze and Guattari, *What Is Philosophy?*, 39.
69. Deleuze and Guattari, *What Is Philosophy?*, 96.
70. Deleuze and Guattari, *What Is Philosophy?*, 59.
71. The concepts of flow, fold, and field developed in this book are therefore borrowed not from Deleuze, who frequently mixes them with stasis, but from the real ontologists of motion: Lucretius, Marx, and Bergson.

72. Marx, *Capital*, afterword to the second edition. "With (Hegel, the dialectic) is standing on its head. It must be turned right side up again, if you would discover the rational kernel within the mystical shell," 103.

References

- Adey, Peter. "If Mobility Is Everything It Is Nothing: Towards a Relational Politics of (Im)mobilities." *Mobilities* 1, no. 1 (2006): 75–94.
- Augé, Marc. *Non-places: Introduction to an Anthropology of Supermodernity*, translated by John Howe. London: Verso, 1995.
- Bauman, Zygmunt. *Globalization: The Human Consequences*. New York: Columbia University Press, 1998.
- Bennett, Jane. *Vibrant Matter: A Political Ecology of Things*. Durham, NC: Duke University Press, 2010.
- Bergson, Henri. *Creative Evolution*, translated by Arthur Mitchell. New York: Modern Library, 1944.
- Bergson, Henri. *The Creative Mind: An Introduction to Metaphysics*, translated by Mabelle L. Andison. Mineola, NY: Dover, 2013.
- Bergson, Henri. *Matter and Memory*, translated by Nancy Margaret Paul and William Scott Palmer. New York: Zone, 1988.
- Bissell, David. "Narrating Mobile Methodologies: Active and Passive Empiricisms." In *Mobile Methodologies*, edited by Ben Fincham, Mark McGuinness, and Lesley Murray, 53–68. Basingstoke: Palgrave Macmillan, 2010.
- Bowden, Sean. "Paul Redding's *Continental Idealism* (and Deleuze's Continuation of the Idealist Tradition)." *Parrhesia*, no. 11 (2011): 75–79.
- Braidotti, Rosi. *Nomadic Subjects: Embodiment and Sexual Difference in Contemporary Feminist Theory*. New York: Columbia University Press, 2011.
- Brassier, Ray. *Nihil Unbound: Enlightenment and Extinction*. London: Palgrave Macmillan, 2007.
- Bryant, Levi R. *Onto-cartography: An Ontology of Machines and Media*. Edinburgh: Edinburgh University Press, 2014.
- Carroll, Sean. *The Big Picture: On the Origins of Life, Meaning, and the Universe Itself*. New York: Penguin Random House, 2016.
- Castells, Manuel. *The Rise of the Network Society*. 2nd ed. Oxford: Blackwell, 2000.
- Connolly, William E. *A World of Becoming*. Durham, NC: Duke University Press, 2011.

- Cresswell, *On the Move: Mobility in the Modern Western World*. Hoboken, NJ: Taylor and Francis, 2012.
- Debaïse, Didier. *Speculative Empiricism: Revisiting Whitehead*. Edinburgh: Edinburgh University Press, 2017.
- DeLanda, Manuel. *Assemblage Theory*. Edinburgh: Edinburgh University Press, 2016.
- Deleuze, Gilles. *Difference and Repetition*, translated by Paul Patton. New York: Columbia University Press, 1994.
- Deleuze, Gilles. *Expressionism in Philosophy: Spinoza*, translated by Martin Joughin. New York: Zone, 2013.
- Deleuze, Gilles. *Logic of Sense*, translated by Mark Lester and Charles Stivale. New York: Columbia University Press, 2009.
- Deleuze, Gilles. *Nietzsche and Philosophy*, translated by Hugh Tomlinson. New York: Columbia University Press, 1983.
- Deleuze, Gilles, and Félix Guattari. *Anti-Oedipus: Capitalism and Schizophrenia*, translated by Robert Hurley, Mark Seem, and Helen R. Lane. Minneapolis: University of Minnesota Press, 1983.
- Deleuze, Gilles, and Félix Guattari. *Thousand Plateaus: Capitalism and Schizophrenia*, translated by Brian Massumi. Minneapolis: University of Minnesota Press, 2014.
- Deleuze, Gilles, and Félix Guattari. *What Is Philosophy?*, translated by Hugh Tomlinson and Graham Burchell. London: Verso, 2015.
- Endres, Marcel, Katharina Manderscheid, and Christophe Mincke. *The Mobilities Paradigm: Discourses and Ideologies*. London: Routledge, 2016.
- Epicurus. "Letter to Herodotus." In vol. 2 of *The Lives of Eminent Philosophers*, by Diogenes Laertius, translated by Robert D. Hicks, 573. London: Heinemann, 1925.
- Eslick, Leonard J. "Substance, Change, and Causality in Whitehead." *Philosophy and Phenomenological Research* 18, no. 4 (1958): 502–15.
- Frello, Birgitta. "Towards a Discursive Analytics of Movement: On the Making and Unmaking of Movement as an Object of Knowledge." *Mobilities* 3, no. 1 (2008): 25–50.
- Giddens, Anthony. *The Consequences of Modernity*. Cambridge: Polity, 1990.
- Graham, Stephen, and Simon Marvin. *Telecommunications and the City: Electronic Spaces, Urban Spaces*. London: Routledge, 2001.
- Grosz, Elizabeth. *The Incorporeal: Ontology, Ethics, and the Limits of Materialism*. New York: Columbia University Press, 2017.

- Gueroult, Martial. *Spinoza: Dieu (Éthique 1)*. Paris: Aubier-Montaigne, 1968.
- Hallward, Peter. *Out of This World: Deleuze and the Philosophy of Creation*. London: Verso, 2006.
- Hardt, Michael. *Gilles Deleuze: An Apprenticeship in Philosophy*. Minneapolis: University of Minnesota Press, 2007.
- Hardt, Michael, and Antonio Negri. *Empire*. Cambridge, MA: Harvard University Press, 2007.
- Harvey, David. *The Condition of Postmodernity*. Oxford: Blackwell, 1989.
- Jameson, Fredric. *Postmodernism, or The Cultural Logic of Late Capitalism*. London: Verso, 1991.
- Kaplan, Caren. *Questions of Travel: Postmodern Discourses of Displacement*. Durham, NC: Duke University Press, 1996.
- Lucretius. *On the Nature of Things*, translated by Walter G. Englert. Newburyport, MA: Focus, 2003.
- Manning, Erin. *Relationescapes: Movement, Art, Philosophy*. Cambridge, MA: MIT Press, 2012.
- Marx, Karl. *Capital: A Critique of Political Economy*, translated by Ben Fowkes. Vol. 1. New York: Penguin, 1976.
- Marx, Karl. *The First Writings of Karl Marx*, translated by Paul M. Schafer. Brooklyn, NY: Ig, 2006.
- Marx, Karl. *Grundrisse: Foundations of the Critique of Political Economy (Rough Draft)*, translated by Martin Nicolaus. New York: Penguin, 2012.
- Marx, Karl. *The Poverty of Philosophy*. New York: International, 1963.
- Massumi, Brian. *Parables for the Virtual: Movement, Affect, Sensation*. Durham, NC: Duke University Press, 2007.
- Merriman, Peter. "Driving Places: Marc Augé, Non-places, and the Geographies of England's M1 Motorway." *Theory, Culture, and Society* 21, nos. 4–5 (2004): 145–67.
- Merriman, Peter. "Marc Augé on Space, Place, and Non-place." *Irish Journal of French Studies*, no. 9 (2009): 9–29.
- Merriman, Peter. *Mobility, Space, and Culture*. London: Routledge, 2013.
- Nail, Thomas. *Being and Motion*. Oxford: Oxford University Press, forthcoming.
- Nail, Thomas. *The Figure of the Migrant*. Stanford, CA: Stanford University Press, 2015.
- Nail, Thomas. *Lucretius I: An Ontology of Motion*. Edinburgh: Edinburgh University Press, 2018.

- Nail, Thomas. *Theory of the Border*. Oxford: Oxford University Press, 2016.
- Prigogine, Ilya, and Isabelle Stengers. *Order out of Chaos: Man's New Dialogue with Nature*. London: Fontana, 1988.
- Redding, Paul. *Continental Idealism: Leibniz to Nietzsche*. London: Routledge, 2009.
- Robinson, Keith. *Deleuze, Whitehead, Bergson: Rhizomatic Connections*. Basingstoke: Palgrave Macmillan, 2009.
- Rosa, Hartmut, and William Scheuerman, eds. *High-Speed Society: Social Acceleration, Power, and Modernity*. Philadelphia: University of Pennsylvania Press, 2009.
- Rovelli, Carlo. *Reality Is Not What It Seems: The Journey to Quantum Gravity*, translated by Erica Segre. New York: Riverhead, 2017.
- Shaviro, Steven. *The Universe of Things: On Speculative Realism*. Minneapolis: University of Minnesota Press, 2014.
- Sheller, Mimi, and John Urry. "The New Mobilities Paradigm." *Environment and Planning A* 38, no. 2 (2006): 207–26.
- Spinoza, Baruch. *Ethics*. In *A Spinoza Reader: The Ethics and Other Works*, translated by Edwin Curley. Princeton, NJ: Princeton University Press, 1994.
- Strogatz, Steven. *Sync: The Emerging Science of Spontaneous Order*. New York: Hyperion, 2014.
- Thrift, Nigel. "A Hyperactive World." In *Geographies of Global Change*, edited by R. J. Johnston, Peter J. Taylor, and Michael J. Watts, 18–35. Oxford: Blackwell, 1995.
- Virilio, Paul. *Speed and Politics*, translated by Mark Polizzotti. New York: Semiotext(e), 1986.
- Whitehead, Alfred North. *Concept of Nature*. Cambridge: Cambridge University Press, 1978.
- Whitehead, Alfred North. *Process and Reality*. New York: Macmillan, 2014.
- Wolff, Janet. "On the Road Again: Metaphors of Travel in Cultural Criticism." *Cultural Studies* 7, no. 2 (1993): 224–39.