Introduction

This chapter asks, What kinds of materials are cities made of? And what are the qualities of those materials? This might seem obvious. They are made of things like houses, apartment buildings, roads, factories, offices, cars and trucks, ports, airports, railway stations and mass transit systems, constructions of stuff like bricks, concrete, steel, glass, wood and stone and so on, right? Cities *are* made of materials like this. But if we look around most urban environments we will also see all sorts of other things. Trees, grasses, shrubs, animals of all different kinds, from domestic cats and dogs, to horses, chickens, and cattle, and wild animals like possums, foxes, rats, mice, raccoons, boars, coyotes, even monkeys and elephants depending which city you find yourself in. You would, if you looked closely enough, and in the right places, see insects and grubs galore. And if we looked even closer we would also start to notice that a whole range of other things are congregating in and circulating through urban environments. Things like energy – in a whole range of forms and for a whole range of entities – as oil, gas, petrol, as electricity, as food, as lighting. Or water; running through pipes and drains, through streams and rivers, stored in reservoirs, filling ponds and swimming pools, festering in puddles, seeping into foundations and walls, falling onto roofs, flooding along roads. Or

waste of all different kinds, from buildings as they are torn down and rebuilt, from factories and offices, from the smoke stacks of power plants, from homes and restaurants, from the tail pipes of trucks, automobiles, and buses. But cities also function through a whole series of apparently immaterial elements. Things like culture, social norms and conventions, law, atmospheres even. Or even stranger elements like code, or information. In much of the social sciences it is these immaterial elements have been viewed as the proper domain through which cities should be understood. It is not that social scientists think the other elements are not important. Rather they think that it is not important to them, after all social science is about the *social*, isn't it?

The following chapter presents a brief outline for studying the materialities of urban life. One aim of what follows is to set out a number of different framings of the material and materiality within contemporary urban studies. But the chapter's main focus is more direct. It is to explain the importance of thinking carefully about the materials and materialities through which urban environments and more broadly cities are constituted. This is not to discount the force of the immaterial elements of cities. Rather, it is to make a particular argument about how we should think about the social. Through thinking through the materialities of urban environments the follow pages attempt to demonstrate how the material and materiality is always shot through with the immaterial. And following from that, the chapter argues that in an important sense the material and materiality do not just hold the social together, in a very real sense they *are* the social.

Six Propositions for Studying Materiality

What follows are six interlinked propositions for thinking about the materialities of cities and urban environments. These should not be treated as definite statements. Rather think of each proposition as a suggestion to help think with the material thickness of urban life.

Proposition One: Materialities are not just buildings and infrastructure. Put another way materiality is not simply the material stuff that grounds the social world. The notion that the material world is in some way central to how to go about understanding cities and urban environments is of course second nature to a great deal of urban theory (see Merrifield 2002; Tonkis 2005; Parker 2015). Architectural and planning theory, for example, are

acutely aware that their thinking is addressed to the potential construction and reformation of real concrete places. And they are aware that it addresses in some sense at least working with construction materials, concrete, steel, glass, wood, and so on. Equally economically oriented urbanists are aware that when they describe land markets, or industrial clusters, or local labour markets, that they are referring to abstractions grounded in actual existing sites; sites woven together with buildings, roads, railways and all sorts of other physical things. Indeed, within much of critical urban studies the fact of this embedded capital is central to how we should understand cities.

Perhaps the classic statement of this avowedly materialist position is provided in the work of David Harvey (1973; 1989; 2000). For Harvey contemporary cities are the product of the dominant mode of economic organization within society. Or put more bluntly cities are the places where capitalism finds its ground. In this framing, the material world – the world of buildings, roads and other physical infrastructures – is not just the background for the action of social, economic and political life. It is the very stuff through which these elements are produced and reproduced. As we create our cities, our cities create us. To put things in more philosophical key we are both the subject and objects of our environments. This is to restate, extend, and urbanize the argument developed by Karl Marx in *Capital* and *Grundrisse*. Referring to the relationship between production and consumption Marx wrote: "production not only creates an object for the subject but also a subject for the object" (Marx 1973: 93). Now what is arresting about this argument, both as configured by Marx and as later developed by Harvey is that it makes clear that buildings are more than just buildings, factories and offices more than just factories and offices, infrastructure is more than just infrastructure. The relations between people, objects, and spaces that they realize is the medium through which capitalism makes and reproduces itself.

The difficulty with such a framing of the material and materiality is that it both goes too far and it does not go far enough. It goes too far in stating that the ultimate source of all social power is rooted in the dynamic power asymmetries of capitalism. One has to ask why must we locate all of the power of the social and its materiality in the dynamics of the mode of production? Why not also take religion, or science, or the force of tradition or nationalism, or even biology and evolution and other similar entities seriously? But for the concerns of this chapter the bigger problem is that such Marxian framings do not go

far enough in acknowledging and accounting for the force – or agency if you wish – of materials and their materialities. Materials and their materialities are more than just objects worked on by human agency. They also as philosophers from Spinoza (1992), to Whitehead (1920), and Stengers (2010) have argued generate their own forms of agency and action. Agencies often both simultaneously interwoven with and independent from human intent.

Proposition Two: Cities are constituted through a diverse range of different materialities woven together in variously continuous and discontinuous ways. So, following, the historian of science Andrew Pickering (2001) we need ways of thinking about materialities that go beyond the social sciences' established notions of subject and object. This could be reframed as a need to think about the range of materialities that hold urban environments together. Of course we can return to the materiality of stones and building material, and point to the different ways buildings are constructed and cared for, the ways they age and transform (see Edensor 2012). There is a longstanding tradition of landscape research that focuses on just this kind of difference. Lars Lerup (2001, 56-7) drawing on the landscape historian J B Jackson (1953) talks about how the American house transformed as it moved west across the continent. Losing its ground and weight, it discarded basements for concrete-piles, brick and stone for chipboard and cinderblocks. In cities like Houston the vernacular house comes to float on the landscape's surface. This is a landscape where "the entire foundation of the ground level ecology is soft, rhythmic and unstable, held together by the roots of the canopy of trees, creating the absurd impression of a city suspended from the treetops from which its cars, riders and roads gently swing."

What is interesting about Lerup's description of Houston is how it pushes past clear definitions of the built and un-built, the human made and the natural. This landscape is a novel mixing of building, nature, dwelling, technology, and more. A landscape "dominated by motion and time and event", where each element "hide[s] an essential vulnerability: trees die, cars and markets crash, and the air slowly kills" (Lerup 2001: 58). This description of Houston is compelling in how it threads together a plurality of different material and materialities through which the city functions. This is an environment that includes both that which is built and in some sense planned by people, but which also incorporates the worlds and agencies of nature, and the cybernetic force of transportation systems and markets (forces that in all sorts of ways exceed the will of

any single individual or group). It is a rendering that places into question what exactly is inside and what outside the materiality of the urban environment. In Lerup's view urbanists don't just have to think about the human built environment and people's goings-on within it. Urbanists need to take into account all sorts of non-human elements and agencies that course through and within cities. Elements whose materialities urbanists have rarely bothered to question. Entities like temperature, or weather, or atmosphere. Entities like air, which in Houston "functions much like … skin, an immense enveloping organ, to be constantly attended to, chilled, channeled, and cleaned. Pools of cool air dot the plane, much like oases in deserts" (Lerup 2001: 58)

Proposition Three: Materialities within cities possess all sorts of often surprising agencies. To say that material in all its plurality plays into the life of cities is to say that cities are also animated by an equally plural range of agencies. Here we loop back to the terrain set out in point one. There we approached the notion that just as we make our cities, our cities make us. One way of thinking about that intertwining is to consider the way urban environments and cities function as enormous sites where materials are assembled, processed, distributed and consumed. This work of transformation involves pulling the natural world into the ambit of human production and reproduction, generating a complex kind of second or urbanized nature. Just as cities are built through nature, cities transform nature. Crucially, however, this second nature is a nature dominated by and made subservient to human power (Smith 1984; Gandy 2002; Swyndeouw 2006; Heynen et a. 2006). This is a useful heuristic. But again it does not give enough space for the plurality of agencies that make up this 'second nature'.

One way to think more expansively about the agency of material is to think beyond ideas of nature and the natural. This is to connect with the work of writers like Michel Serres (1982), Sarah Whatmore (2002), Bruno Latour (2005), Jane Bennett (2010) and others who have explicitly worked at inviting the busy-ness of the non-human into the world of the social. These thinkers push the notion of agency beyond the idea of human intentionality, to focus on the fact that non-human materials *affect* us (as individuals, as groups, as societies) in all sorts of ways – obvious and not, consciously and not. And this fact of affecting represents a kind of agency.

This can be understood in a number of ways. It can be understood in the ways that humans are constantly picking up and swapping properties with the non-human (Olsen 2010). It can be understood in the ways that as we come to know better how to feed and nourish ourselves, as we come to understand the complex microscopic worlds of microbes and biology, and as we have created evermore complex medical collectives of experts, hospitals, and medicine, we have as an urbanized species become physically larger (taller and heavier), longer lived, and less fecund (Floud et al 2011). This is not just to point to the politics of biopower highlighted by Michel Foucault (1979) and others (Cisney and Morar 2015). It is also to point to a very different experience of being human in a world where our bodies and lives are formed and manifested in such environments (Shove 2003; Sloterjijk 2004). This agency can also be seen in the way epidemics such as the Black Death that swept through Europe in the 14th century transformed social, political and economic history. Travelling along trade routes and pooling in the cities that acted as hubs for a growing inter-urban system of commerce, the microbial disease vector *yersinia pestis* piggy-backed on fleas, which piggy-backed on rats, themselves piggy backing on merchant boats and carts, which themselves sprung from the aggregating power of cities (McNeill 1976).

In a gentler way, the agency of the non-human can be seen in the ways that the presence of trees, scrubs, and all sorts of plants draw ecologies around them. Not only do they help clean and purify the air of cities. There is good evidence that they help contain and smooth our moods (Van den Berg et al. 2007). They also provide habitats for a vast array of wildlife that populate urban environments. This includes species like foxes, rats, mice, raccoons, cockroaches, and mites, that live off the waste of human society. It also includes a perhaps more surprising populations of animals such as wild boars, coyotes, peregrine falcons and deer, to name just a few species who to many people's surprise manage to find productive niches with urban environments (Lorimer 2015). Indeed, rather than the urban representing some kind of tamed second nature, this suggests a wilder, more turbulent and surprising ecology. A world of edgelands, feral landscapes, and unofficial countrysides (Farley and Symmonds Roberts 2011; Maybey 1973; Monbiot 2014).

Proposition Four: Urban materialities enfold a diverse range of temporal and spatial scales. Along with cities the previous paragraph talked of the microbiological along with the bodies of

parasites, the hulls of ships and trading routes. It talked of the relation between food, public health, medical knowledge, and human bodies. And of the ecologies inhabited by animals like peregrine falcons, foxes and coyotes, the world of edgelands, feral landscapes, and unofficial countrysides. These are just a few of the materialities circulating and aggregating in urban environments. Nonetheless, to think of all the diverse assemblages of entities outlined in the previous chapter is to confront entities that confound taken for granted notions of scale.

Urban studies, of course, has been much interested in scale. Writers like Neil Smith (1992), Neil Brenner (1999), and Erik Swyngedouw (2004), have highlighted the importance of scale and its social and political construction to contemporary urban dynamics. And, indeed, largely through the theories of these authors concepts of scale have come to infuse and animate much of urban studies. What is striking about many of the assemblages of materiality listed above is how they confound established notions of scale. They do so partly through the way they extend into 'scales' not really accounted for in conventional renderings. They include the molecular and the microscopic, along with ecological ranges that stretch across and beyond boundaries of cities, regions and nations. Indeed, this mixing up of scales, temporal and spatial, suggests a more topological diagramming of the materiality of cities (Amin and Thrift 2002; Marsdon et al. 2005; Latham 2011). This is a way of thinking that places into question notions of what is big or small, enduring and ephemeral.

We could use any of the above cases as examples. But it might be more interesting to turn to the example of energy and mobility. Here we can talk about the ways that the emergence of urban environments suffused with the energy of fossil fuels has created environments that flicker, hum and thump with machinic intensity; propelling light, heat, air, metal and rubber, data, and much more through urban environments. How the intimacy and immediacy of much of this energy – wrapping up, cocooning, carrying vulnerable and tiring human bodies – is sourced through the burning and recycling of solar energy accumulated over millennia, and transformed and stored over geological timescales. Thinking further we encounter the strange energetic entanglements of the increasingly sedentary lifestyles of many who live in cities, with their weird en-foldings of the animate and inanimate, the biological and the inorganic, of speed and stasis, of the very small and the very large (Ng and Popkin 2012; Roberts 2010). How the 'natural'

scale of the human body becomes a kind of extended mobile hybrid; the automobile, the house, and so forth. How inhabiting urban environments that demand less and less of the individual muscles of human bodies pulls us away from a genetic inheritance founded in all sorts of ways on dynamic corporeal movement (Lieberman 2013; Latham 2015).

Proposition Five: Cities are constantly involved in generating new organisations of materiality.
It should be clear from the previous four propositions that cities involve not only manifold entanglements of human and non-human agency, but that they are constantly involved in generating novel nexuses of such entanglements. It is hardly surprising then that living in cities involves dealing with – and organizing – these entanglements and the agencies that emerge through them in all sorts of ways. Thinking of this points attention to the various networks of infrastructures that have developed to support contemporary urban life. We can think of infrastructures of sanitation and waste disposal. Water provision. Electricity networks and systems of power supply. And we can think about how those infrastructures incorporate the very small and intimate, along with the very large and extended. They involve things like regimes of personal hygiene and bodily care (Shove 2003), along with the microscopic like viruses, bacteria, mineral trace elements and so on. At the same time they involve technological systems that spread over hundreds if not thousands of kilometers (Hughes 1993). This also points us towards thinking about the ways these infrastructures enfold and are animated by all sorts of kinds of information.

To think about information, yet again, requires thinking past the idea of materiality as simply the material (cf. Proposition 1). Following the suggestion of Pickering (2001) it requires understanding urban materiality as a dynamic process of sense making. Infrastructure functions as infrastructure – as systems that support social life – through the interweaving of material and technological elements with all sorts of social and political institutions that maintain and sustain them (Graham and Thrift 2007). Networks like electricity grids, or sewerage systems do not simply run themselves. They themselves rely on a vast entanglement of further technologies and conventions; post codes, design standards, billing and metering systems, to name just a few examples. Matthew Gandy (2005) refers to this infrastructural skeleton as a kind of cyborgisation. But these structuring of cities fabric can be understood as more lively than that. Think of the ways that spread of computer code through the fabric of cities – within infrastructures, within

personal devices, within the objects like automobiles and house we inhabit – is involved in generating urban spaces that are coming to take on an increasingly sentient quality (Thrift 2014).

Proposition Six: Thinking about the materialities of cities does not just mean returning to the concrete. Throughout the previous five propositions – and indeed in the introduction of this chapter – there has been a continual invocation of material plenitude within urban environments. That there is so much *stuff* that makes up urban worlds has been repeated over and over. And it would be tempting – logical even – to take from this that thinking seriously about the material and materiality implies a valorization of the concrete-ness of cities. That, however, is not the argument we wish to make. Yes, there is a sense that attending to the materialities of our urban environments demands attending to a certain kind of concrete-ness. At the same time, paying attention to the concrete does not imply a retreat from abstraction in urban theory. Rather, it pushes us to consider how abstraction might be used to allow us draw out the force of the material and materiality (McCormack and Latham 2004: 707; McCormack 2012).

What does that mean? Well we can think of at least four conceptual vehicles that might help make sense of the force of material and materiality in urban theory. First, materiality is *emergent*. The materiality of the urban is emergent in that it is product of a mesh of heterogeneous, small-scale, self-organizing, processes (Johnson 2001; Latham 2003). This is not to say that cities are places where anything can happen, or anything goes. Of course cities are also planned and designed. Rather it is to repeat that cities are about the manifold relations between a whole range of human and non-human forms of life, a complex of relations that lacks any underpinning structural logic. Second, cities emergent materiality can be understood as *machinic* (Amin and Thrift 2002). This notion of the machine is foreshadowed in the urban critic Lewis Mumford's (1934) description of even ancient and medieval European cities as enormous transversal machines. Developing this intuition, Felix Guattari (1995) talks of how the machinic should be understood not as the outcome of but as the prerequisite of technology. It is the presence and force of certain social, linguistic, corporeal, and cognitive machines that allows specific materialities to emerge in cities. This conceptualization of the machinic is powerful because it moves us away from thinking about technologies and bodies as having an already predefined and configured materiality. Instead, it provides a vehicle for

understanding this relation in terms its "emergence between corporeal and machinic materialities, relations that may display systematic tendencies without being structural" (Latham and McCormack 2004: 707).

Thirdly, the emergent, machinic, materiality of cities can be understood *diagrammatically*. That is to say, cities and the spaces that make them up can be understood through diagrams some of which map out imminent relations of power, whilst others act as a generative device for imagining possible "territories of practice" (Somol in Latham and McCormack 2004: 708). Such diagrams can also be thought of in much more ordinary or everyday key. Think of the forces drawn together through the lines of a football field, of the curbs of a sidewalk, or a children's playground. Lastly, the materiality of cities can be thought of as *expressive*. Not expressive in the sense of an individual subject. Nor just in terms of a festival or event. It is the expressiveness in terms of the emerging relations and event-ness of bodies and materials. To quote Brian Massumi (2002: xxi):

> Expression is not in a language-using mind, or in a speaking subject *vis-à-vis* its objects. Nor is it rooted in an individual body. It is not even in a particular institution, because it is precisely the institutional system that is in flux. Expression is aboard in the world. ... It is non-local, scattered across a myriad of struggles over what manner of life-defining nets will capture and contain that potential in reproducible articulations, or actual functions

Conclusion

So cities are a complex amalgam of different materialities. They are made up of the 'natural' as much as the built, the small as well as the large, the non-human as much as the human, the improvised along with the designed. In the midst of this complexity the concept of urban materialities is productive precisely because it pushes urbanists to think with and through these diverse assemblages of agency that populate and animate urban environments. But the usefulness of materiality goes beyond simply that a sensitizing heuristic. The concept of materialities is not just a device that nudges us towards attending to the heterogeneity of urban life. Thinking about urban materialities forces to think carefully about other domains of the urban. Domains like the political. The politics

of cities and urban environments are intertwined with the diverse agencies of the material in all sorts of ways. From questions of how people move around cities, to who deals with their waste, to how access to the multiple infrastructures of power, information, and communication that weave through a city's fabric are managed and controlled, materialities of all kinds animate urban politics. What is more, the emergent agencies that populate urban worlds demands that urban researchers recognize that the political is not predefined or configured. But some that is discovered, acted into, full of surprises. And this is something that equally true for the domains of the social or the economic.

Further reading

- Amin, A. (2008). Collective culture and urban public space. *City*, *12*(1), 5-24. A fabulous account of what a post-humanist materially oriented urban studies might look like.

- Lorimer, J. (2015) Spaces for wildlife: alternative topologies for life in novel ecosystems, Chapter 8 in Wildlife and the Anthropocene: Conservation After Nature, Minneapolis: University of Minnesota. Explores the novel ecologies that cities open up for wildlife of all different sorts.

- Molotch, H. (2014). "Below the Subway: Taking Care Day In and Day Out, Chapter 3 in Against security: How we go wrong at airports, subways, and other sites of ambiguous danger. Princeton University Press. An engaging study of the New York subway.

- Simone, A. (2004). People as infrastructure: intersecting fragments in Johannesburg. Public culture, 16(3), 407-429. Describes the materialities of life in Johannesburg and explains why attending to this everyday materiality matters.

A Text Box

Cities and the Materialities of Thermal Comfort

Materiality brings into view a range of relations that are easily overlooked, or not considered properly urban. Consider the question of temperature and thermal comfort.

Urban knowledge based economies are to a very large extent based around an architecture of large office buildings. Think of the skyline of global cities like New York, Hong Kong, Dubai, or Shanghai. Think also of the landscapes of suburban business parks and edge cities. The functionality of these economic sites and the buildings that populate them is dependent on intricate systems of air conditioning that regulates their temperature and humidity independently of the immediate weather outside. Not only does the heating and cooling of these buildings consume vast amounts of energy. The ubiquity of such systems of temperature control within the urban environment seems to be leading to the emergence of a global temperature norm. Whereas previously people in different countries expressed wide variations in the range of temperatures they found comfortable, research has shown that such preferences are beginning to converge around a temperature of 22 degrees Celsius. In many places urban dwellers seem to be becoming less tolerant of, and less skilled in dealing with, natural variations in weather and climate. This in turn is pulling people to spend more and more time inside safely cocooned from such variation. Wealthy, advanced economies, are not just urban societies, they are also increasingly societies of the indoors (Hitchings 2011; Nicol et al. 2012). So, even as global change pushes us to consume less energy, contemporary patterns of urban life and the practices that they enfold pull us towards futures dependent on complex machinic infrastructures of atmospheric control.

Bibliography

Amin, A. and Thrift, N. (2002) *Cities: Reimaging the Urban*, Cambridge: Polity.

Bennett, J. (2010) *Lively Matter*, Durham, NC: Duke University Press.

Brenner, N. (1999). Globalisation as reterritorialisation: the re-scaling of urban governance in the European Union. *Urban studies*, 36(3), 431-451.

Cisney, V. W., & Morar, N. (Eds.) (2016) *Biopower: Foucault and Beyond*. Chicago: University of Chicago Press.

Edensor, T. (2012). Vital urban materiality and its multiple absences: the building stone of central Manchester. *Cultural Geographies*,

Farley, P., & Roberts, M. S. (2011) *Edgelands: Journeys into England's True Wilderness*. London: Random House.

Floud, R., Fogel, R. W., Harris, B., & Hong, S. C. (2011) *The Changing Body: Health, Nutrition, and Human Development in the Western World since 1700*. Cambridge: Cambridge University Press.

Foucualt, M. (1979) *The History of Sexuality*, Vo. 1. London: Allen Lane.

Gandy, M. (2003) *Concrete and Clay: Reworking Nature in New York City*. MIT Press.

Gandy, M. (2005) Cyborg urbanization: complexity and monstrosity in the contemporary city. International Journal of Urban and Regional Research, 29, 1: 26-49.

Graham, S., & Thrift, N. (2007). Out of order understanding repair and maintenance. *Theory, Culture & Society*, 24(3), 1-25.

Guattari, F. (1995) *Chaosmosis: An Ethico-Aesthetic Paradigm*. Sydney: Power Books.

Harvey, D. (1973) *Social Justice and the City*, Oxford: Blackwell.

Harvey, D. (1989) *The Urban Experience*, Oxford: Blackwell.

Harvey, D. (2000) *Spaces of Hope*. Berkeley: University of California Press.

Heynen, N. C., Kaika, M., & Swyngedouw, E. (2006) *In the Nature of Cities: Urban Political Ecology and the Politics of Urban Metabolism*. London: Routledge.

Hitchings, R. (2011) Researching air-conditioning addiction and ways of puncturing practice: professional office workers and the decision to go outside. *Environment and Planning A*, 43, 12: 2838.

Hughes, T. P. (1993) *Networks of Power: Electrification in Western society, 1880-1930*. Baltimore: John Hopkins University Press.

Jackson, J. B. (1953) The westward moving house, *Landscape*, 2, 3: 8-21.

Johnson, S. (2001) *The Connected Life of Ants, Brains, Cities and Software*. London: Penguin.

Lachmund, J (2013) *Greening Berlin: The Co-Production of Science, Politics, and Urban Nature*, MIT Press.

Latham, A. (2003). Urbanity, lifestyle and making sense of the new urban cultural economy: notes from Auckland, New Zealand. *Urban Studies*, 40(9), 1699-1724.

Latham, A. (2015). The history of a habit: jogging as a palliative to sedentariness in 1960s America. *Cultural Geographies*, 22(1), 103-126.

Latham, A. (2011). Topologies and the multiplicities of space-time. *Dialogues in Human Geography*, 1, 3: 312-315.

Latham, A., & McCormack, D. P. (2004). Moving cities: rethinking the materialities of urban geographies. *Progress in Human Geography*, 28, 6: 701-724.

Lieberman, D. (2013) *The Story of the Human Body: Evolution, Health and Disease.* London: Allen Lane

Latour, B. (2005) *Reassembing the Social*, Oxford: Oxford University.

Lerup, L. (2001) *After the City*, Cambridge, Mass.: MIT.

Lorimer, J. (2015) *Wildlife and the Anthropocene: Conservation After Nature*, Minneapolis: University of Minnesota.

Mabey, R. (1973) *The Unofficial Countryside.* London: Vintage.

Massumi, B. (2002) *Parables for the Virtual: Movement, Affect, Sensation.* London: Duke University Press.

Marston, S. A., Jones, J. P., & Woodward, K. (2005). Human geography without scale. *Transactions of the Institute of British Geographers*, 30(4), 416-432.

McCormack, D. (2012). Geography and abstraction Towards an affirmative critique. *Progress in Human Geography*, 36(6), 715-734.

McNeill, W. H. (1976). *Plagues and Peoples*, Garden City, NY: Anchor Press.

Nicol, F., Humphreys, M., & Roaf, S. (2012) *Adaptive Thermal Comfort: Principles and Practice.* London: Routledge.

Monbiot, G. (2014) *Feral: Rewilding the Land, the Sea, and Human Life.* Chicago: University of Chicago Press.

Molotch, H. (2014) *Against Security: How We Go Wrong at Airports, Subways, and Other Sites of Ambiguous Danger.* Princeton: Princeton University Press.

Olsen, B. (2010) *In Defense of Things: Archaeology and the Ontology of Objects.* Plymouth: Rowman Altamira.

Roberts, I. (2010) *The Energy Glut: The Politics of Fatness in an Overheating World.* Zed Books Limited.

Serres, M. (1982) *The Parasite.* Minneapolis: University of Minnesota Press.

Shove, E. (2003) *Comfort, Cleanliness and Convenience.* Oxford: Berg.

Sloterdijk, P. (2004) *Sphären III: Schäume*, Frankfurt aM: Suhrkamp.

Smith, N. (1984) *Uneven Development: Nature. Capital, and the Production of Space* New York, NY: Blackwell.

Smith, N. (1992). Contours of a spatialized politics: homeless vehicles and the production of geographical scale. *Social Text*, 55-81.

Spinoza, B. (1992) *Ethics: with The Treatise on the Emendation of the Intellect and Selected Letters.* London: Hackett Publishing.

Stengers, I. (2010) *Cosmopolitics.* Minneapolis: University of Minnesota Press.

Swyngedouw, E. (2004). Globalisation or 'glocalisation'? Networks, territories and rescaling. *Cambridge review of International Affairs*, 17, 1: 25-48.

Swyngedouw, E. (2006). Circulations and metabolisms:(hybrid) natures and (cyborg) cities. *Science as Culture*, 15, 2: 105-121.

Thrift, N. (2014). The 'sentient'city and what it may portend. *Big Data & Society*, 1(1), 2053951714532241.

Van den Berg, A. E., Hartig, T., & Staats, H. (2007). Preference for nature in urbanized societies: Stress, restoration, and the pursuit of sustainability. *Journal of Social Issues*, 63, 1, 79-96.

Whatmore, S. (2002) *Hybrid Geographies: Natures Cultures Spaces.* Sage, London.

Whitehead, A. N. (1920) *The Concept of Nature.* Cambridge: Cambridge University Press.