CHAPTER 17

Foucault and Geometrics

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Foucault's work on biopolitics and biopower has received an enormous amount of attention in recent years, and been developed in a range of different, and not always complementary, ways. This was initially taking up and developing some fairly brief comments in his published books, but is now supplemented by a range of analyses in his lecture courses. With the courses between the 1974 Rio lectures on medicine through "*Society Must be Defended*" (1975–76) to *On the Government of the Living* (1979–80), we can trace his interest and its development.[1] The purpose of this chapter is not to trace his inquiry in this register,[2] nor to track those multiple appropriations, extensions and critiques. Instead, it is to think about how his work can be useful in a parallel and related inquiry, not looking at biopolitics, but at *geopolitics*.

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Population-Territory; Biopolitics-Geopolitics

I have argued elsewhere that Foucault is misguided in suggesting that population came to displace territory as the principal object of government.[3] Nonetheless, I think that his work examining the emergence of population is enormously helpful in tracing the related emergence of territory. Just as the relation between these two developments needs to be rebalanced historically, I think the same today is true if we are to look at the relation between biopolitics and geopolitics. A contemporary concentration on biopolitics at the expense of geopolitics would, I think be flawed, in just the same way that a neglect of biopolitics would be. Rather, as I've suggested historically with the parallel developments of population and territory out of earlier, vaguer notions of the people or land, respectively, work today needs to interrogate the relation between these two registers, rather than privilege one over the other.

Amy Swiffen, for example, suggests that "biopolitical sovereignty is less invested in the efficacy of the rule of law in a specified territory than in the capacity to control and change the life of population in a territory."[4] This is a helpful orientation, provided that we continue to understand that the question of territory remains crucial in both determinations. We cannot imagine, as has been done all-too-often in the past, that territory is a simple container for these complicated and contested processes. As Swiffen underlines, "biopolitics is a term that applies when biopower comes into contact with territorial sovereignty as conventionally conceived."[5] As I've argued at length elsewhere, territory and sovereignty are not straightforward concepts, and the conventional conception masks a great deal of complicated interrelations.[6] Strategies turned toward the object and constitution of population are similarly directed toward the object and constitution of territory, which should be understood more as a process than an outcome, more as a political technology than a container for political action (see also Bigo in this volume). Indeed, the very same techniques directed toward population are also those that are central to the idea of territory—calculative techniques, modes of measuring and controlling—that find their expression in land surveying, terrain analysis, cartographic practices, administrative strategies, statistical surveys, legal codes, financial techniques and military technologies.

One of the most productive developments of Foucault's work has been in thinking about biometrics, studying how calculative measures of life and its component parts can be analyzed and utilized. Louise Amoore, for example,

has written powerfully about the "biometric border."[7] Matthew Hannah has noted that we should think biopower rather than biopolitics, with the latter understood as a particular, and narrower, set of questions within the former.[8] This is a helpful distinction, but there is a threefold relation that needs explication—Biopower, Biopolitics and Biometrics. While the literature on the first two can be related to writings by Agamben, Esposito, Hardt and Negri and Dillon and Reid,[9] biometrics has found its most able exponent in the work of people like Louise Amoore and Joseph Pugliese.[10]

How then might that threefold relation be helpful in understanding geopolitics? Foucault's work on biopolitics, governmentality and the politics of calculation can, as I have argued elsewhere,[11] be very helpful in understanding transformations of political space and the concept of territory. How can this be extended to look at the world, the global? The first shift is in thinking about geopower as a broader category within which geopolitics operates. The work here, obliquely, relates to the project of Gilles Deleuze and Félix Guattari, whose interrogation of the relation between deterritorialization and reterritorialization, especially as outlined in their book *A Thousand Plateaus*, requires much more careful interrogation if we are to use it to understand contemporary political-geographical relations, or a new world Imperium.[12] Reterritorialization is a term with especial potential: spatial relations are not just unmade by processes such as globalization, but remade. They take these ideas forward in *What is Philosophy?* which, building on Nietzsche discusses the idea of geophilosophy.[13] Deleuze and Guattari describe this by suggesting that "thinking is neither a line drawn between subject and object nor a revolving of one around the other. Rather, thinking takes place in the relationship of territory and the earth."[14]

One of the most productive developments of this work has been in the writings of Elizabeth Grosz's *Chaos, Territory, Art: Deleuze and the Framing of the Earth* is a useful initial point of reference.[15] In it, Grosz suggests a fundamental distinction between earth and territory. The territory has something added to the earth, it is framed, it has qualities, it is ordered and constructed.

> The frame is what establishes territory out of the chaos that is the earth. The frame is thus the first construction, the corners, of the plane of composition. With no frame or boundary there can be no territory, and without territory there may be objects or things but not qualities that can become expressive, that can intensify and transform living bodies. Territory here may

> be understood as surfaces of variable curvature or inflection that bear upon them, singularities, eruptions or events. Territory is that which is produced by the elaborate, if apparently useless, activity of construction, attention grabbing, and display that mark most sexual selection.[16]

For Grosz, then, there is a vitalist element to this, a vibrancy. Territory and body go together in this sense, as both are framed, ordered: "Territory and body only emerge as such to the extent that such qualities can be extracted."[17] While I have some doubts concerning this element of her thinking, which comes very close to work on *territoriality*, it can nonetheless be another way of approaching the idea that territory is a process, a tangled multiplicity of a range of relations—political, economic, strategic, technical and legal.[18] An important caution here is that it is not at all clear that Deleuze and Guattari use the term "territory" to mean the same as political geographers, and as yet no-one has worked through those complexities with sufficient care and detail. Nonetheless, we can turn back from that inquiry and see how it helps us to make some sense of the earth. Grosz declares that,

> There is only earth rather than territory until qualities are let loose in the world. Qualities and territory coexist, and thus both are the condition for sexual selection and for art making—or perhaps for the art of sexual selection and equally the sexuality of art production.[19]

This relates to her earlier claim about how "framing" is a way of structuring and making sense of the inchoate,

> The earth can be infinitely divided, territorialized, framed. But unless it is in some way demarcated, nature itself is incapable of sexualizing life, making life alluring, lifting life above mere survival. Framing is how chaos becomes territory. Framing is the means by which objects are delimited, qualities unleashed and art made possible.[20]

This work has only recently begun to be analyzed by geographers, but it offers some powerful resources for thinking what might be understood as a more active "geo" in geopolitics, and perhaps, by extension, geometrics.[21] In her opening comments to a discussion of her work at the Association of American Geographers in 2012, Grosz suggests that,

> The relations between the earth and its various forces, and living beings and their not always distinguishable forces, are forms of geopower, if power is to be conceived as the engagement of clashing, competing forces… Power—the relations between humans, or perhaps even between living things—is a certain, historically locatable capitalisation on the forces of geopower.[22]

At its best, such a politics of the earth would take into account the power of natural processes, or resources; the dynamics of human and environment; the interrelation of objects outside of human intervention; the relation between the biosphere, atmosphere and lithosphere; and the complex interrelations that produce, continually transform and rework the question of territory and state spatial strategies. There are a number of resources that can be drawn upon in such an inquiry. Manuel de Landa has begun to sketch some of the ways that this could be understood in his *A Thousand Years of Nonlinear History*;[23] literary theorist Jonathan Bate looks at the way poetry can retrieve a connection to the earth.[24] John Protevi has suggested the hybrid multiplicity of "geo-hydro-solar-bio-techno-politics" to make sense of the connections.[25] In a related inquiry, Jane Bennett similarly wants to retrieve an active, earthy sense to what she calls vibrant matter.[26] Within a wider rethinking of geopower, we can then resituate what we mean by geopolitics, as a politics of the earth.

Geopolitics has, today, become effectively a synonym for global politics. Armchair strategists still come up with grand plans for understanding and changing the world;[27] critical geopolitics scholars offer broad analyses of such strategies and the interlinked relations of capital, state power, nationalism and territory. Robert Kaplan's recent *The Revenge of Geography* seems destined to be all that many people learn of Geography, especially in policy circles, as if exhuming Mackinder were the way forward;[28] or they read Harm de Blij's last offering of *Why Geography Matters*.[29] But even the critical geopolitics work tends to think of this as global or world politics—new ways for understanding and making sense of that particular scale.[30] In these terms, we risk losing the element of the "geo," as earth, and replacing it with other ideas. So geopolitics is being re-conceived as global politics; geometry is a branch of mathematics, abstract and detached; geography is no longer earth-writing but a loose spatial sensibility to work that could equally have been done in other disciplines. Perhaps it is in geology that we find the true inheritor of the etymological sense of the term, the *logos* of the *geo*. Yet as Robert Frodeman notes, even there, "geology," while

"once identified exclusively with the study of the solid Earth (…) has lost ground to 'Earth sciences' (…) meant to highlight the need for an integrated study of air, water, soil, rock, ice, and biota."[31] In the light of the work by Grosz and others, we can begin to see how geopolitics could be rethought in a way that was closer to the etymological roots of the word, as earth-politics, yet for progressive political purpose. Geopolitics literally means politics of the "geo," the earth, land, planet or world. Each of those terms would need to be thought carefully, both in relation to and in differentiation from each other, and from a notion of the global. But in broad terms, this geopolitics would sit alongside, rather than replace, the attention given to biopolitics in recent years. Here I particularly want to retrieve the sense of geopolitics and geometrics as, respectively, a politics of the earth and earth-measuring.

Geometrics

This is the second key point. Just as with biopower, biometrics and biopolitics, there is a threefold relation between geopower, geometrics and geopolitics. Geometrics can be understood in the traditional sense of the term, a measuring of the earth, as geometry. In Herodotus there is a description of the original earth-measurers, the Egyptians sent to remark the boundaries of fields after the Nile's floodwaters had subsided.[32] Heidegger claims that Thales is crucial here, as the first scientific philosopher and first mathematician. He took the Egyptian geometry of empirical measurement, and turned it into an abstract and deductive process.[33] This originary, fundamental, sense became increasingly abstract in Aristotle and Euclid, and especially when fully mathematicized in the sixteenth and seventeenth centuries.[34]

An understanding of the politics of calculation in relation to the way the world is constructed might help us to track how mechanistic ways of rendering have become increasingly technocratic. These are something that we might call regimes of global calculation.[35] To think the world of globalization forces us to realize that this is not a transcending of spatial or territorial problematics, but rather their reconfiguration. Territory—understood as the political corollary of calculative space, as a political technology—offers us insight into the world scale or the notion of the worldwide. In Henri Lefebvre's terms, *l'échelle mondiale* is not the same as *le niveau global*; the world scale is distinct from the global or general level.[36] The process of globalization is an acceleration of the understanding

of space and time as coordinates on a three- and four-dimensional grid. The understanding of space and time as calculative, and extension as the primary characteristic of material nature, is to make it amenable to science through geometry and measure more generally. A difference of degree rather than an ontological transformation is thus the way to grasp the spatiality of globalization.

But there are traces in the tradition too—in my work on territory, I think about some of this in the argument that we can conceive of territory as a *political technology*. This, again following Foucault, thinks about the techniques used for measuring land and controlling terrain, rather than just territory as land or terrain. While recognizing that the material, the geophysical, is important, particular political strategies directed toward that are equally significant. In other words, looking at measure and control, as markers for the technical and the legal, is significant alongside economic and strategic concerns. Territory is a *political* question, but the political needs to be understood in multiple registers, as economic, strategic, legal and technical.

In the historical account of the emergence of the concept and practice of territory, I put some stress on what I called "the geometry of the political." In this I looked at writings including those of the Roman land surveyors in the *Corpus Agrimensorum Romanorum*—literally, the work of the Roman field measurers, as well as the work of the 14th legal scholar Bartolus of Sassoferrato, who as well as writing legal texts that I think are crucial in the emergence of the relation between law and place, jurisdiction and territory, also wrote a text on the issues relating to rivers. There were three key questions for Bartolus: what happens to the possession of land if the river changes course? What about an island that emerges from a river? Who owns the land of a dried up riverbed? These legal questions can be traced back to Justinian's *Institutes* in relation to property of farms on either side of the river, and are the same kinds of issues that concern international river boundaries today. But Bartolus is interesting because he makes use of a fairly rudimentary geometry to legislate on such cases—a founding text of legal geography, or legal geometry. So we might be able to retrieve the Egyptian sense of geometry to make sense of measures of the earth. But there are also a range of other ways geometrics might be thought today beyond the applied sense of land surveying; looking at the measuring of the yields of oil and gas, soil fertility and air quality.

The Geometrics of Geopolitics

There is substantial potential in this. One aspect would be to relate this to questions being raised by Phil Steinberg's work on the ocean, and especially in his emerging interest in ice, with its dynamic properties and blurred status between sea and solid land. Following the UN Convention on the Law of the Sea, and long-standing laws concerning "solid land" territory, Steinberg has suggested we need to produce a "law of ice" to make sense of resource politics and borders in, especially, the Arctic. Similarly, work on river boundaries is complicated by the dynamics of rivers. While the political may want to remain static, the geophysical is dynamic. This forces us to understand the geomaterial, the geophysical, rather than just the geopolitical in a narrowly conceived way.

In a somewhat different register, Shiloh Krupar's 2013 genre-disrupting *Hot Spotter's Report* examines the legacies of military toxic waste on landscapes and bodies,[37] in a related way to how Rachel Woodward turned military geographies from the impact of geographical considerations on the military to the impact of the military presence and militarism on the environment and landscape.[38] Or, again, Matthew Huber's book on the everyday politics of oil in the United States—*Lifeblood: Oil, Freedom and the Forces of Capital*—talks of a "historical ecology of neoliberalism."[39] He sees this as a challenge to work thinking oil as "a strategic object amid the absolute spaces of national territories, pipelines, oceans, and military bases."[40] In part, his approach is directed toward Timothy Mitchell's *Carbon Democracy*.[41] Nonetheless, Mitchell is helpful in the wider project too. He suggests, for example, that "governing the global supply of oil, like most things that we call 'global', rested on the control of a comparatively small number of sites—a few dozen major oilfields, pipelines and terminals, and the handful of bulk tanker fleets that journeyed between them."[42]

Another instance would be in political ecology, or on the geopolitics of food. One example would be John Perkins's book *Geopolitics and the Green Revolution*, subtitled "wheat, genes and the Cold War."[43] This book explores how four countries, the United States, Britain, India and Mexico all tried to increase agricultural production through genetic breeding of plants during the Cold War, as a measure of national security. Simon Dalby notes that, "Cold War scholars will remember the importance of satellite-based estimates of the Soviet harvest. North Korea watchers do similar calculations today."[44] Another would be the work Saskia Sassen is doing on land grabs, feeding, she suggests, "the disassembling of national

territory."[45] There is also the question of population density—which is interesting as a function of the relation of number to area, bridging biopolitics and geopolitics.[46] In other words, we need to think about these calculative techniques, in both biopolitical and geopolitical registers, as biometrics and geometrics, measuring life and the earth. So, following Foucault, just as those calculative techniques were crucial to modern statecraft, so too are these techniques, these regimes of global calculation, crucial today in thinking about the world, earth and geopolitics.

The Geopolitics of Climate Change

In his 2013 *Political Geography* lecture at the Association of American Geographers annual conference, Simon Dalby generously engaged with my essay "Secure the Volume: Vertical Geopolitics and the Depth of Power," the previous year's *Political Geography* lecture, given at the Royal Geographical Society annual conference in July 2012. In that essay, I suggested that the spaces of geography were often thought of as areas, as flat, as planes or surfaces rather than as volumes. Taking the practices of security as my inspiration, I looked at what happened if we seriously considered height and depth. In doing so I linked work on vertical geopolitics—an emerging field that looks at aerial bombardment, drone warfare, visual surveillance and so on—with work on urban exploration and the security issues raised by the subsoil, tunnels, infrastructure and foundations. In recent work, Eyal Weizman has begun to propose an idea of forensic architecture, a means to understand and comprehend "the deep surface of the earth."[47] This too would contribute to that work of rethinking a politics of the earth.[48]

A renewed politics of the earth would be appropriate to the complexities of space and territory in three dimensions, rather than the tendency to imagine political space as a surface, an area. My examples in "Secure the Volume" were drawn from the West Bank—developing claims made by Weizman in the book *Hollow Land*—and Israel's border with Lebanon at Rosh Hanikra. I juxtaposed Peter Sloterdijk's work on spheres with Paul Virilio's early work on bunker architecture and his own architectural practice with Claude Parent which emphasized the function of the oblique, angles and surfaces, the question of volume. I suggested that thinking volume—about volume, through volume, with volume—rather than simply the vertical was essential if we were to make sense of the complexities of territory, today certainly, but I think the same holds true for the relation between place and power in all historical and geographical contexts.

How would our thinking of geopower, geopolitics and geometrics work if we took the earth; the air and the subsoil; questions of land, terrain, territory; earth processes and understandings of the world as the central terms at stake, rather than a looser sense of the "global"? There would be, I think, a need for a greater concentration on the question of terrain, a geophysical element within geopolitics, is a theme that Gastón Gordillo has begun to examine in some detail.[49] There is little on this question, aside from some work in military geography, but it pervades, in a perhaps uncritical way, work taking a political-strategic approach to questions of territory.[50] But there is a beginning of a move to take this notion more seriously. While he eschews use of the term "terrain," I would see Derek Gregory's work on the "natures of war" as sympathetic to this project. Equally, some volumes in Polity Press's "Resources" series, take the geophysical very seriously. Derek Hall's book on land is one example, but the series also includes volumes on water, oil, timber and so on.[51]

In the "Secure the Volume" essay, I suggested that both biopolitics and geopolitics could be "understood through processes and technologies of bio-metrics and geo-metrics, means of comprehending and compelling, organizing and ordering."[52] I closed by suggesting the idea of the volumetric,

> Work in this register equally needs to think in terms of the volumetric. The Oxford English Dictionary suggests this word dates from 1862, is formed from Volume and Metric, and means 'Of, pertaining to, or noting measurement by volume.' While the term is used in cartography and physics, there is real potential in working out in detail its two aspects: the dimensionality implied by 'volume' and the calculability implied by 'metric.' The political technology of territory comprises a whole number of mechanisms of weighing, calculating, measuring, surveying, managing, controlling and ordering. These calculative techniques—similarly to those employed in biometrics and geo-metrics—impact on the complexities of volume. In terms of the question of security, volume matters because of the concerns of power and circulation. Circulation does not simply happen, nor does it need to be contained, controlled and regulated, on a plane. Thinking about power and circulation in terms of volume opens up new ways to think of the geographies of security.[53]

Picking up on and developing some of these ideas, Simon Dalby provides a number of examples of ways of tracking and measuring the global impact of changing climates. One of the most striking is the previously

mentioned satellite images of drought in the former Soviet Union, North Korea and Arab countries. He notes that, "these technologies are also modes of knowing, charting, measuring and calculating the earth as it is transformed."[54] Dalby suggests that "How all this is to be measured and surveilled is a matter of geometrics in Elden's terms."[55]

Dalby notes that at the same time as my "Secure the Volume" lecture "prominent climate activist Bill McKibben published an article in *Rolling Stone* magazine that suggested that the most important geometrics of our time relate to basic aspects of the climate system."[56] This is not the language used by McKibben himself, even if the questions he is posing fit neatly into these proposed categories. Dalby argued, entirely rightly, that "the materialities of spaces matter, not just the volume," drawing on the work of Neil Smith.[57] Perhaps the work on terrain might be an element within a multi-dimensional material geopolitics. But most importantly for my argument here he puts forward the term "Neoliberal geometrics," suggesting that "the logic of his [i.e. my] argument fits into the new mathematics of global security, and the market logics of carbon measurement."[58]

> Extending that argument to suggest that the volume that matters most now are some of the key geometrics related to the atmosphere and the ocean, and the struggles to secure them are the next phase of geopolitics, also emphasizes both the continuity of climate as a matter in geopolitical thinking and the importance of taking seriously the reversal of the assumed relationship between climate and humanity in the most recent stage of the Anthropocene.[59]

'Anthropocene Geopolitics'

And it is with the Anthropocene that I want to conclude (see also Taylan in this volume). If we think of a range of questions such as risk, security, prediction; aid, sustainability, development; finance, the economy, populations, many of these would fit within the broad range of what Foucault called biopolitics. This would be to take politics of calculation and situate it in relation to the politics of life. That is an invaluable inquiry, and what is being proposed here is in no sense an attempt to marginalize that work. What is being suggested is that alongside those registers we need to think about earth, land, the world and the global, recognizing that these are not simply frames within which regimes of calculation take place.

The spaces within which, between which, over which, the regimes operate, shape and calculate is a crucial element; but it is what is being done to those, made possible by those, these as the objects of transformation and possibility. Alongside biopolitics attention then to geopolitics, not in the loose sense of global or international politics, but a politics of the earth. Alongside the broad realm of biopower attention to what Elizabeth Grosz calls geopower, of "the engagement of clashing, competing forces"—some of which are human, more of which are living, many of which are what Jane Bennett calls vibrant matter, or what might be called animate objects. That last term is the best I can imagine make sense of Ben Marcus's wonderful little novel *The Age of Wire and String*.[60] Recall Grosz's suggestion of the relation between geopower and human power,[61] which can be usefully paired with William Connolly's argument in *The Fragility of Things*:

> One theme of this book is that the planet, and indeed the cosmos, is replete with self-organizing, spatiotemporal systems flowing at different speeds, levels of sophistication, and degrees of self-sustaining power. These impersonal systems are open to some degree and never in perfect equilibrium; they interact, with each having a degree of entanglement with several others.[62]

Alongside the crucial emphasis on the types of calculation, of reduction to number, of modes of measure, that can be understood under the term of biometrics, what about the techniques of calculation, operations of measure and control, which are directed toward the earth, the geo? This broader, retrieved sense of geometrics, that would include but not be reducible to the abstract or applied arts of geometry, would, I think, help us to make sense of "regimes of calculation" in their relation to *global* governance.

Such a politics of the earth ultimately aims to be appropriate to the anthropocene. Especially so in what Simon Dalby has called "Anthropocene Geopolitics."[63] In that, at least, we should insist on a serious, critical, focus on the notion of the "Geo," more than there has been in the past, even in *critical* geopolitics. To put this another way, why is Simon Dalby *not* Anthony Giddens or John Urry, both of whom have written about the politics of climate change?[64] There is a real importance to a geographical perspective to this most geographical of political questions.

This is what I mean by a rethinking of geopolitics—a renewed emphasis on the material, the earth, the geo element of these political questions. William Connolly has talked of the need for thinking through the relation between political economy and environmental issues, especially in the light of a philosophy of becoming. He suggests that,

> To come to terms with looping relations between capitalist production, carbon and methane emissions, state policy, consumption practices, glacier movements, and climate change sets the stage to link political economy regularly to the behavior of non-human force fields.[65]

So, our thinking about the Anthropocene and geopolitics would benefit from thinking more carefully about earth and metrics. Foucault's contribution to world politics can then be positioned as a genuine thinking about the politics of the world, the politics of the "geo." If political geography, geopolitics, is to live up to the promise of its names, then it is crucial that it is at the very forefront of such debates.

Notes

1. Michel Foucault, *'Society Must Be Defended,'* transl. David Macey (London: Penguin, 2003); *On the Government of the Living: Course at the Collège de France (1979–1980)*, edited by Michel Senellart, transl. Graham Burchell, (London: Palgrave, 2014).
2. Some of the work of tracing Foucault's concerns in this period is undertaken in my book *Foucault's Last Decade* (Cambridge: Polity, 2016).
3. See Stuart Elden, "Governmentality, Calculation, Territory," *Environment and Planning D: Society and Space* 25(3) (2007): 562–580; and "How should we do the History of Territory?" *Territory, Politics, Governance* 1, no 1 (2013): 5–20.
4. Amy Swiffen, *Law, Ethics and the Biopolitical* (London: Routledge, 2011), p. 93.
5. Ibid., p. 63.
6. See Stuart Elden, *The Birth of Territory* (Chicago: University of Chicago Press, 2013).
7. Louise Amoore, "Biometric Borders: Governing Mobilities in the War on Terror," *Political Geography* 25(3) (2006): 336–51.
8. Matthew G. Hannah, "Biopower, Life and Left Politics," *Antipode* 43(4) (2011): 1034–55.
9. Giorgio Agamben, *Homo Sacer: Sovereign Power and Bare Life*, transl. Daniel Heller-Roazen (Stanford: Stanford University Press, 1998); *The Open: Man and Animal*, transl. Kevin Attell (Stanford: Stanford University Press, 2004); Michael Hardt and Antonio Negri, *Empire* (Cambridge: Harvard University Press, 2000); *Multitude: War and Democracy in the Age of Empire* (New York: The Penguin Press, 2004); *Commonwealth* (Cambridge: Harvard University Press, 2009); Julian Reid, *The Biopolitics of the War on Terror: Life struggles, liberal modernity and the defence of*

logistical societies (Manchester: Manchester University Press, 2006); Michael Dillon, *Biopolitics of Security: A Political Analysis of Finitude* (London: Routledge, 2015).

10. Joseph Pugliese, *Biometrics: Bodies, Technologies, Biopolitics* (London: Routledge, 2010); Louise Amoore, *The Politics of Possibility: Risk and Security beyond Probability* (Durham, NC: Duke University Press, 2013); and see also Philippe Bonditti, "From Territorial Space to Networks: A Foucaldian Approach to the Implementation of Biometry," *Alternatives* 29 (2004): 465–82, and his contribution to this volume.
11. See Elden, *The Birth of Territory.*
12. Gilles Deleuze and Félix Guattari, *A Thousand Plateaus: Capitalism and Schizophrenia*, transl. Brian Massumi (London: Athlone, 1988).
13. See Mark Bonta and John Protevi, *Deleuze and Geophilosophy: A Guide and Glossary* (Edinburgh: Edinburgh University Press, 2004); and Ben Woodard, *On an Ungrounded Earth: Towards a New Geophilosophy* (Brooklyn, NY: Punctum Books, 2013).
14. Gilles Deleuze and Félix Guattari, *What is Philosophy?* transl. Hugh Thompson and Graham Burchell (New York: Columbia University Press, 1994), p. 84. See Roberto Esposito, *Living Thought: The Origins and Actuality of Italian Philosophy*, transl. Zakiya Hanafi (Stanford: Stanford University Press, 2012), p. 12.
15. Elizabeth Grosz, *Chaos, Territory, Art: Deleuze and the Framing of the Earth* (Durham, NC: Duke University Press, 2008).
16. Grosz, *Chaos, Territory, Art*, pp. 11–12. On the understanding of territory, deriving from Deleuze and Guattari, *A Thousand Plateaus*, see p. 47.
17. Grosz, *Chaos, Territory, Art*, p. 102.
18. See Stuart Elden "Land, Terrain, Territory," *Progress in Human Geography*, vol 34 (2010): 799–817.
19. Grosz, *Chaos, Territory, Art*, p. 102.
20. Ibid., p. 17.
21. See Kathryn Yusoff, Elizabeth Grosz, Arun Saldanha, Catherine Nash and Nigel Clark, "*Geo*power: A Panel on Elizabeth Grosz's *Chaos, Territory, Art: Deleuze and the Framing of the Earth*," *Environment and Planning D: Society and Space* 30(6) (2012): 971–88, p. 971.
22. Grosz in Yusoff et al. "Geopower," p. 975. Grosz has worked some of these questions through in relation to Darwin in *The Nick of Time: Politics, Evolution, and the Untimely* (Durham, NC: Duke University Press, 2004); *Time Travels: Feminism, Nature and Power* (Durham, NC: Duke University Press, 2005); and *Becoming Undone: Darwinian Reflections on Life, Politics and Art* (Durham, NC: Duke University Press, 2011).
23. Manuel de Landa, *A Thousand Years of Nonlinear History* (New York: Zone Books, 1997).

24. Jonathan Bate, *The Song of the Earth* (London: Picador, 2000).
25. John Protevi, *Life, War, Earth: Deleuze and the Sciences* (Minneapolis: University of Minnesota Press, 2013).
26. Jane Bennett, *Vibrant Matter: A Political Ecology of Things* (Durham, NC: Duke University Press, 2010), p. 3.
27. See, for example Thomas P. Barnett, *The Pentagon's New Map: War and Peace in the Twenty-First Century* (G.P. Putnam's Sons, 2004).
28. Robert D. Kaplan, *The Revenge of Geography: What the Map Tells Us About Coming Conflicts and the Battle Against Fate* (New York: Random House, 2012).
29. Harm de Blij, *Why Geography Matters: More than Ever* (New York: Oxford University Press, second edition, 2012).
30. Classic texts include Gearóid Ó Tuathail, *Critical Geopolitics: The Politics of Writing Global Space* (Minneapolis: University of Minnesota Press, 1996); and John Agnew, *Geopolitics: Re-visioning World Politics* (London: Routledge, 1998 (second edition 2003)).
31. Robert Frodeman, *Geo-logic: Breaking Ground between Philosophy and the Earth Sciences* (Albany, NY: SUNY Press, 2003), p. 3.
32. Herodotus, *The Histories*, transl. Robin Waterfield (Oxford: Oxford University Press, 1998), p. 109.
33. Martin Heidegger, *Die Grundbegriffe der Antiken Philosophie* (Frankfurt am Main: Vittorio Klostermann, 1993), pp. 40, 51–2. See Edward A. Maziarz & Thomas Greenwood, *Greek Mathematical Philosophy* (New York: Frederick Ungar, 1968), p. 7.
34. On the conception of space and its underpinning in calculation that has dominated our conceptions of modern political life see my *Speaking Against Number: Heidegger, Language and the Politics of Calculation* (Edinburgh: Edinburgh University Press, 2006) and *The Birth of Territory*; as well as R.B.J. Walker, "Gulliver and the territorial state", in *Inside/Outside. International Relations as Political Theory* (Cambridge: Cambridge University Press, 1993), pp. 125–140.
35. A preliminary version of some of these arguments was first presented as a keynote to a workshop on "Regimes of Calculation and Global Governance," at the Balsillie School of International Affairs, Waterloo, Ontario. The phrase "Regimes of Global Calculation" was developed as a way of engaging with the themes of that event and the other papers presented there. Subsequent versions were given at the University of Basel, Zurich and Groningen. I am grateful to audiences in each place for comments.
36. See Henri Lefebvre, *De l'État* (Paris: UGE, Four Volumes, 1976–78); *State, Space, World: Selected Essays*, edited by Neil Brenner and Stuart Elden (Minneapolis: University of Minnesota Press, 2009).

37. Shiloh R. Krupar, *Hot Spotter's Report: Military Fables of Toxic Waste* (Minneapolis: University of Minnesota Press, 2013).
38. Rachel Woodward, *Military Geographies* (Oxford: Wiley-Blackwell, 2004).
39. Matthew T. Huber, *Lifeblood: Oil, Freedom and the Forces of Capital* (Minneapolis: University of Minnesota Press, 2013), p. xv.
40. Ibid., p. 2.
41. Timothy Mitchell, *Carbon Democracy: Political Power in the Age of Oil* (London: Verso, paperback edition, 2013).
42. Ibid., p. 67.
43. John H. Perkins, *Geopolitics and the Green Revolution: Wheat, Genes, and the Cold War* (New York: Oxford University Press, 1998).
44. Simon Dalby, "The Geopolitics of Climate Change," *Political Geography* 37(1) (2013): 38–47, 39.
45. Saskia Sassen, "Land Grabs Today: Feeding the Disassembling of National Territory," *Globalizations* 10(1) (2013): 25–46. See also her book *Expulsions: Brutality and Complexity in the Global Economy* (Cambridge, MA: Harvard University Press, 2014).
46. This work could be related to Mark Whitehead's study *State, Science and the Skies: Environmental Governmentality and the British* Atmosphere (Oxford: Wiley-Blackwell, 2009) and Gavin Bridge's work on the subsoil and natural resources, for example "The Hole World: Scales and Spaces of Extraction," *New Geographies*, no 2 (2009): 43–49.
47. Eyal Weizman, "Forensic Architecture: The Deep Surface of the Earth," Society and Space 30th Anniversary Lecture, 3rd July 2012, available at http://societyandspace.com/2012/08/22/eyal-weizman-society-and-space-30th-anniversary-lecture/ (site verified on October 15, 2015); see also *Forensic Architecture: Notes from Fields and Forums* (English-German edition, Kassel: dOCUMENTA, 2012) and *The Least of All Possible Evils: Humanitarian Violence from Arendt to Gaza* (London: Verso, 2012).
48. See Stuart Elden, "Secure the Volume: Vertical Geopolitics and the Depth of Power," *Political Geography* 32(2) (2013): 35–51; and the references within that piece. On tunnels, see additionally Nicolas Pelham, "Gaza's Tunnel Phenomenon: The Unintended Dynamics of Israel's Siege," *Journal of Palestine Studies* 41, no 4, 2012, http://palestine-studies.org/jps/fulltext/42605 (verified on October 15, 2015).
49. To date these have largely been on his blog: http://spaceandpolitics.blogspot.co.uk (website verified on October 15, 2015).
50. See also Bernard Cache, *Earth Moves: The Furnishing of Territories*, transl. Anne Boyman (Cambridge, MA: MIT Press, 1995), Ch. 1. The book is dedicated to Gilles Deleuze.
51. Derek Hall, *Land* (Cambridge: Polity, 2013).
52. Elden, "Secure the Volume," p. 49.

53. Ibid.
54. Dalby, "The Geopolitics of Climate Change," p. 39.
55. Ibid., p. 40.
56. Ibid., p. 42. See Bill McKibben, "Global Warming's Terrifying New Math", *Rolling Stone*, July 19 2012. Available at http://www.rollingstone.com/politics/news/global-warmings-terrifying-new-math-20120719 (verified on October 15, 2015).
57. Dalby, "The Geopolitics of Climate Change," p. 43. Neil Smith, *Uneven Development: Nature, Capital and the Production of Space* (Atlanta: University of Georgia Press, third edition, 2008).
58. Dalby, "The Geopolitics of Climate Change," p. 43.
59. Ibid., p. 45.
60. Ben Marcus, *The Age of Wire and String* (Illinois: Dalkey Archive Press, 1995).
61. Grosz, in Yusoff et al., "Geopower," p. 975.
62. William E. Connolly, *The Fragility of Things: Self-Organizing Processes, Neoliberal Fantasies, and Democratic Capitalism* (Durham, NC: Duke University Press, 2013), p. 81.
63. Simon Dalby, "Recontextualising Violence, Power and Nature: The Next Twenty Years of Critical Geopolitics," *Political Geography* 29(5) (2010): 280–88; Simon Dalby, "Biopolitics and Climate Security in the Anthropocene," *Geoforum* 49 (2013): 184–92.
64. Anthony Giddens, *The Politics of Climate Change* (Cambridge: Polity, second edition, 2011); John Urry, *Climate Change and Society* (Cambridge: Polity, 2011).
65. Connolly, *The Fragility of Things*, pp. 30–1.