

Terrain, politics, history

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Abstract

This article is based on the 2019 *Dialogues in Human Geography* plenary lecture at the Royal Geographical Society. It has four parts. The first discusses my work on territory in relation to recent work by geographers and others on the vertical, the volumetric, the voluminous, and the milieu as ways of thinking space in three-dimensions, of a fluid and dynamic earth. Second, it proposes using the concept of terrain to analyse the political materiality of territory. Third, it adds some cautions to this, through thinking about the history of the concept of terrain in geographical thought, which has tended to associate it with either physical or military geography. Finally, it suggests that this work is a way geographers might begin to respond to the challenge recently made by Bruno Latour, where he suggests that ‘belonging to a territory is the phenomenon most in need of rethinking and careful redescription; learning new ways to inhabit the Earth is our biggest challenge’. Responding to Latour continues this thinking about the relations between territory, Earth, land, and ground, and their limits.

Keywords

geographical thought, politics and geopolitics, terrain, territory, volume

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Introduction

This article is a proposal for and critical assessment of the usefulness of the concept of terrain to analyse the political materiality of territory. Terrain, I suggest, helps us to think about aspects of territory that have perhaps been neglected in previous work. I move through four stages. The first situates my work on territory within a set of debates about the vertical, the volumetric, the voluminous, and the milieu as ways of thinking space in three-dimensions, its materiality and a fluid and dynamic earth. Second, building on previous work by myself and others, I propose using the concept of terrain to analyse the political materiality of territory, and its

complexities. The third part of the article recognises that the concept of terrain has a history in geographical thought, which has tended to associate it with either physical or military geography. I therefore outline some of these histories, and situate the contemporary work in critical relation to them, as well as outlining some possible future directions. Finally, and most briefly, I suggest that this work on terrain, as a shared concern between human and physical

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geography, allows a geographical response to a challenge recently made by Bruno Latour about territory and the Earth in the new climatic regime. While Latour raises some interesting questions, the discipline of geography has already been doing work that begins to answer them.

A 'volumetric turn'?

While my work on territory has found its fullest expression in book form (Elden, 2009, 2013a, 2018), this contribution is a more direct continuation of work in two articles – 'Secure the Volume: Vertical Geopolitics and the Depth of Power', published in *Political Geography* (Elden, 2013b) and 'Legal Terrain: The Political Materiality of Territory', published in the *London Review of International Law* (Elden, 2017a). In both of those pieces the aim was to think about territory in an explicitly material register. Territory has sometimes been understood as a political form of abstract space, but while that can be helpful in understanding its history, this understanding potentially masks some of the complexities of relations between people, power, and place. In 'Secure the Volume', I drew on a wide range of literature, showing how work on vertical geopolitics could be linked to work on subterranean geographies to think about political geography more seriously in three dimensions, volume rather than area. This proposal around volume was explicitly indebted to many previous writers.

Stephen Graham was one of the pioneers of attention being paid to the third dimension, as more than just an additional perspective but a full orientation (i.e. Graham, 2004), which has been realised in his book, *Vertical: The City from Satellites to Bunkers* (2016). Graham's work, and his collaboration with Lucy Hewitt (2013) was an important early invention. Like Graham, I have also benefitted from the work of Eyal Weizman (2007) on the geographies of the Israeli occupation of the West Bank. Peter Adey and colleagues' work on 'vertical security' (Adey, 2010; Adey et al., 2013) was another helpful reference, while Bruce Braun's 2000 paper on 'Producing Vertical Territory' is also important, though often absent from the wider debates.

In my 2013 article, 'volume' was proposed rather than just the vertical to suggest that what was required was more than simply adding a vertical axis to two horizontal ones. In part, this approach was drawing on the architectural work of Claude Parent and Paul Virilio ((1996; see Virilio, 1993 [1976]; Virilio, 2008 [1975])). It was an attempt to think about slopes, angles, texture, matter in motion, and other complexities above and below ground. So, tunnels rather than just shafts, trajectories not only height. It also used the idea of the 'volumetric', stressing both the capacity and the calculative metric of this way of conceiving space. In this terminology, it was building on Jeremy Crampton's (2010) work on cartography, and the term 'volumetric' was also one invoked by Graham and Hewitt (2013).

This work on the vertical, volume, and the volumetric has been taken up and utilised in a range of productive ways. Some of this research has been historical (i.e. Anthony, 2018; Endfield and van Lieshout, 2020; Hawkins, 2020; Marston, 2019; Melo Zurita and Munro, 2019), but much has been focused on 20th century or contemporary political issues. These would include Andrew Harris (2015) on 'vertical urbanism', Donald McNeill's (2019) recent work on 'volumetric urbanism' in Singapore, Rachael Squire (2016a, 2016b, 2017a, 2017b) in her work on Gibraltar and US undersea bases in the Cold War, Katherine Sammler (2019) on sea-level rise, Klaus Dodds and Mark Nuttall (2016) in work on the materiality of ice and the sea-bed, especially in the Arctic and Antarctic (also, see Bravo, 2019; Dodds, 2018, 2019), Johanne Bruun (2017, 2020) in her study of science and politics in Cold War Greenland, work on vertical structures and surfaces in cities (Mubi Brighenti and Kärrholm, 2018), a special issue of *Geopolitics* on Subterranean Geographies edited by Rachael Squire and Klaus Dodds (2020),¹ and in a dizzying sequence of papers produced for two online fora collated by Franck Billé for *Cultural Anthropology and Society and Space* (2018, 2019), leading to a significant book-length collection (2020). Harriet Hawkins and Billé have even called this work the 'volumetric turn' (Billé, 2020; Hawkins, 2019).² It might be responded that geographers have always

thought in three-dimensions, but the take-up of these ideas suggests something important is being added in contemporary debates.

Yet while the applications have been widespread, this work has also been criticised for various reasons. Philip Steinberg and Kimberley Peters (2015) suggest using the term ‘voluminous’ rather than ‘volumetric’, pointing to water as an element that escapes some of the static, cubic, ways of thinking, forcing us to consider mobility and flow. Voluminous perhaps captures lived and embodied better than the merely calculative volumetric, though both are important. Steinberg and Peters are resistant to what they describe as a turn to geology in political geography, of layers of time and space, and instead stress the importance of geophysics (2015: 254–255; see Bobbette and Donovan, 2019; Clark, 2017; Yusoff, 2013, 2017). As such, they suggest that work reorienting geopolitics to a politics of the ‘geo’ should not just be of the ‘Earth’, but of ‘politics in relation to water, ice, subsoil, and the submarine’ (2015: 255).³ A number of examples of analyses that take that latter approach can be found in a book that Steinberg and Peters edited with Elaine Stratford, *Territory beyond Terra* (2018). These approaches perhaps avoid the problematic layering that Steinberg and Peters identify, instead seeing spaces folded and overlapping, more a patchwork than a tessellation.

Other perspectives have further enriched these debates. Andrew Harris (2015) stresses that we should look at non-militarised as well as militarised spaces from this perspective with respect to its materiality and dimensionality. Peter Adey (2013) and Rachael Squire (2017a) argue that we need to take the bodies in these spaces more seriously. Kimberley Peters and Jennifer Turner (2018) have further developed this idea in thinking about carceral geographies, and what they call a ‘politics of capacity’, of what fills these volumes (also, see Turner and Peters, 2017). Peters and Turner rightly ask that we go beyond merely thinking about volume, and look at ‘the *qualities* or *characteristics* that come to define volume’ (2018: 1050).

Equally Andrea Ballesterio has pushed further than just thinking about the horizontal and vertical together, suggesting that such work ‘also requires

troubling the radical separation between above and below the surface because of its tendency to engender a certain fetishizing of subterranean spaces. A richer understanding of how surface and subsurface bleed into each other helps keep in mind that making sense of this continuum is a practice that is distributed between humans and nonhumans’ (2019: 6). One striking example of this is explored by Harriet Hawkins, looking at the case of an island off the coast of Sicily, Ferdinanda, which has been above the waves at times, and below it at others, as a result of seismic activity, raising questions of who has laid claim to it in the past, the present, and a possible future (Hawkins, 2020).

Elaine Campbell (2019) explores different ways of thinking about three-dimensions, suggesting that Weizman’s work on the West Bank is too exceptional to stand as a good model for other places, and suggests that looking at extra-urban spaces is also significant. She therefore proposes Michel Foucault’s notion of ‘milieu’ over Peter Sloterdijk’s spheres (1998–2004, 2011, 2014, 2016). Campbell suggests that ‘securitised space is neither horizontal nor vertical, volumetric nor spherical, but is a relational, emergent configuration of different elements which is always-already in-the-making’ (2019: 18), and concludes that:

From the standpoint of a security milieu, social injustices – such as discrimination, marginalisation, exclusion, over-policing, hyper-surveillance – born of racialized, gendered, classed and ageist spatial practices are traced (and traceable) through a myriad of intersecting political relationalities; just as questions of volume, enclosure, exceptionality, and proximity, cannot be settled in advance of milieu formation, the politics of three-dimensional security emerge through the contingent, creative, dynamic and unpredictable interplay of multiple trajectories of power (Campbell, 2019: 19).

The notion of milieu she is drawing on is introduced in Foucault’s *Security, Territory, Population* lectures from 1977–1978 (2004, 2008). This course is the one in which his famous ‘Governmentality’ lecture appears. Foucault begins the course with some lectures on town planning and how authorities deal with challenges such as food shortages and

disease. These opening lectures are intended to illustrate issues around security, normalisation, and the management of population. Administrators, architects, and others become regulators of a milieu, a dynamic space of circulation, distribution, and relation:

The milieu is an ensemble of natural givens – rivers, marshes, hills – and a set of artificial givens – an agglomeration of individuals, of houses, etcetera. The milieu is a certain number of combined, overall effects bearing on all who live in it. It is an element in which a circular link is produced between effects and causes, since an effect from one point of view will be a cause from another . . . What one tries to reach through this milieu, is precisely the conjunction of a series of events produced by these individuals, populations, and groups, and quasi natural events which occur around them (2004: 22–23, 2008: 21).

Foucault's use of the term therefore captures some of the aspects that contemporary work is trying to address – the combination of natural and artificial aspects (though we might question those terms), and the relation between people and places. However, we need to recognise some of the challenges of using this term. Georges Canguilhem's work on milieu is exemplary in this regard, and Foucault is drawing on his understanding in indicating that milieu comes into biology with Lamarck, following its use by physics beforehand in Newton and the Newtonians. One of the most important pieces in Canguilhem's *Knowledge of Life* is a lecture on 'The Living and the Milieu' (2008: Chapter 5; see Elden, 2019: Chapter 3). One of Canguilhem's key points is that a milieu is a medium, a mid-point (*mi-lieu*), and it can either refer to an individual being in an environment, a situation or surroundings, or the internal milieu of the regulation of an organism. There are elements of both vitalism and mechanism in the notion which perhaps create some tensions for how we might think about its use today. Foucault, notably, does not pursue the idea in his own work.⁴

What the notion of milieu does provide, in both Foucault's discussion and Campbell's appropriation, is the interaction of the human with their environment. Indeed, the term for Canguilhem is a

translation of the German notion of *Umwelt*, the surrounding or enviroing world. The term milieu is not without its difficulties, and it still does not perhaps capture the specifically material aspects. Milieu also has the potential problem of making the focus the human *in* the environment, and their interaction, rather than the relations between multiple forces, both human and non-human. Nonetheless, while urban work on volume is important, Campbell is surely right to push us to think beyond it. She is also instructive in stressing work that looks at the relation between human bodies and built and physical landscapes. This approach is not to separate the human and the built from the natural and the physical only to look at their interaction, but rather to stress that they are always already intertwined and related in complicated ways.

In the 'Secure the Volume' article, I therefore proposed a notion of volumetrics to sit alongside more established ways of thinking the politics of metrics, namely geometrics and biometrics (Elden, 2013a: 49). The balance should be continued, rather than stressing one over the other. This is a similar argument to one I made over a decade ago against replacing geopolitics with biopolitics, suggesting that Foucault's stress on population in this same lecture course should not be seen over and above territory as an object of governmentality, but that population and territory were both produced and regulated by a similar set of techniques (Elden, 2007). In the development of work on the geographies of volume, Peter Forman recognises a similar danger:

Yet despite Elden's assertion that multiple calculative techniques may simultaneously play into these security performances, this work has inspired a rapidly growing geopolitical literature on volume and security that currently risks privileging the volumetric as a primary mode of political analysis (2020: 11).

There is an extensive literature on biometrics (i.e. Amooe, 2006; Amooe and Hall, 2009; Pugliese, 2010), and some interest in a sense of geometrics that extends beyond geometry (see Dalby, 2013; Elden, 2017b and its references). Geometrics and volumetrics, taken with critical work on biometrics, can perhaps be useful in analysing these relations.⁵

In this understanding, discussions of the vertical, of volume, the volumetric, the voluminous, the sphere, and milieu are, despite some differences of topic and approach, all trying to grapple with the importance of understanding space in its dimensionality and materiality. What I will suggest here is that ‘terrain’ might be a useful way of addressing those concerns, as a particular approach to political space and particularly territory.

The question of terrain

In a 2010 paper which was a first draft of the introduction to *The Birth of Territory* (Elden, 2010a, 2013a), the notion of ‘terrain’ was used as a shorthand for what I called a political-strategic understanding of territory. The point was that while a political-strategic sense of terrain was certainly one way to think about territory, and so too was a political-economic sense of land, neither alone nor in combination were they sufficient to grasp the complexity of territory. The argument was that we should not collapse territory simply into the question of land, property, and rent, on the one hand, and terrain, conflict, and struggle on the other.

The article suggested that we should also think about territory in relation to political-legal questions – where does the law apply, where does it cease to apply, and what kind of law is operable – and political-technical ones, including practices like surveying, measuring, cartography, and navigation. When I suggested, following Foucault’s term, that territory was a political technology, or bundle of political technologies, I intended the technological to be understood as more than merely the technical, but more in the sense of *techne*, an art or practice. Thinking territory as a political technology was a way of trying to capture the multiple ways in which territory is produced and reproduced, a process rather than an outcome, with the arts or practices including laws and administration. This approach was employed in both political work on territory in the ‘war on terror’ and in tracing a history of the concept of territory (Elden, 2009, 2013a).

In more recent work, I have further developed that already expansive schema in understanding the complexities of territory. I still think that these four

registers – political-economic, strategic, legal, and technical – are really important. But we should go still further. This development of my approach has been in dialogue with others, in part in relation to critiques, but also with those pursuing their own lines of inquiry. It means taking some account of colonial questions in relation to territory (see Halvorsen, 2018), to take the body more seriously, and the physical nature of the landscape, the places over which, through which, territories are established and contested. Some of this theorisation is developed in my most recent book on territory, *Shakespearean Territories* (Elden, 2018). While this is a book about how territory features in Shakespeare’s plays, I also use Shakespeare to develop the theorisation of territory. In the material register, for example, I explore Shakespeare’s interest in technologies such as land-surveying, cartography, and the military. I also discuss the scene in *Henry IV, Part I* in which rebels against the King discuss dividing the kingdom along the lines of rivers, only for one to complain that the river goes in an unfair direction, and to propose having its course changed.

More needs to be done, of course, in these different registers. But in trying to better account for the physical materiality of territory, I have also gone further in thinking about previously explored issues. One aspect has been the question of land, in relation to Henri Lefebvre especially, whose writings on rural political economy and sociology are an important part of his work, but relatively neglected in Anglophone studies (see Elden, 2004: Chapter 4). A forthcoming collection of his work on rural questions, which span economy, sociology, and geography, edited with Adam David Morton, will situate and introduce his work on this theme (Lefebvre, forthcoming). Lefebvre is best known as an urbanist and theorist, but his doctoral thesis was on peasant communities in the Pyrenees, and he entered the Centre National de Recherche Scientifique after World War II as a researcher on rural issues. It was research on this theme that led Lefebvre to urban concerns, through the observation of the dual process of industrialisation and urbanisation in his home region. Lefebvre wrote a book on the Pyrenees (1965), published his secondary thesis on a Pyrenean valley (1963), and his primary thesis on

rural sociology has recently been published posthumously (2014). There is also a sequence of papers on this theme in his book, *From the Rural to the Urban* (1970). In his examinations of rural sociology and political economy, Lefebvre shows that land is much more than merely an economic concern (see, initially, Elden and Morton, 2016; Lefebvre, 2016).

This rethinking of land has also been considered in some recent PhD research. Mara Duer's (2017) work on contemporary struggles between the Mapuche people in Chile and the state and agribusiness shows how these were struggles over the idea of 'land' as well as the use made of it. Leo Steeds (2019) shows how there is a specific moment in the history of political-economic thought in which the richness of land as a category and practice becomes reduced merely to a question of rent. In other words, the impoverished understanding of land is historically produced, not essential. More generally, Nicholas Blomley (2016, 2019) and Henry Jones (2019) have both suggested that the colonial and legal aspects of land need to be more fully examined, and that the question of property is crucial (on land ownership, see Linklater, 2013 and Christophers, 2018). Tania Li (2014a, 2014b) has done some very valuable work exploring this question, as have a number of other anthropologists and political scientists (i.e. Gordillo, 2014; Mitchell, 2002; Moore, 2005; Scott, 2009).

Terrain can also be a means of approaching the physical landscape. The work of the ICE-LAW project run by Phil Steinberg at International Boundaries Research Unit (IBRU), Durham University's Centre for Borders Research, which involved discussions with geographers, architects, lawyers, and others has helped to show the importance of the physical nature of territory. The ICE-LAW project pushed theorisations of territory beyond static, dry land, and required thinking about the complexities of indeterminate and changing environments.⁶ Together this work has suggested how the question goes beyond a sense of the political-strategic, but also the geophysical aspects of terrain. This work on terrain has also been in dialogue with Gastón Gordillo (2019), who makes the suggestion that terrain is 'the only spatial category that (in contrast to place, territory, or landscape) evokes material forms, volumes and textures

that are not reducible to human control and appropriations'. Thus while territory is shaped and made by human actions, the landscapes which those actions inherit, divide, command, and transform cannot be seen as entirely under their control.

The way that these issues can work outside of human agency will be returned to below, but it is important to note that the relation of the geophysical and the geopolitical can also be exploited. One example would be the way that the US-Mexico border does not just make use of human-built infrastructure such as the wall or fences, but also the physical landscape of the desert, rivers, and mountains as itself part of the barrier. For the group, No More Deaths, the United States uses the desert as a 'weapon'.⁷ By closing off main crossing points, or concentrating more prevention in those areas, they channel migration through ever more dangerous terrain. This is not a new challenge, exclusive to the Trump or Obama administrations. Bill Clinton's Prevention Through Deterrence strategy established this back in the 1990s,⁸ though there are unquestionably further challenges today with the Immigration and Customs Enforcement (ICE) agency (see Uhlmann, 2019).

Of course, this terrain also provides a challenge to any fortification that might be built. In 1979, the United States Geological Survey made a series of 1:25,000 scale infrared aerial photographs of the entire length of the boundary; a sequence of images which have now been digitised by the Library of Congress.⁹ In 2016, Josh Begley made a film which showed the physical nature of the boundary, entitled 'Best of Luck with the Wall', demonstrating the challenges of the terrain along the 1,954 miles of the line. As Begley describes it: 'By focusing on the physical landscape, I hope viewers might gain a sense of the enormity of it all, and perhaps imagine what it would mean to be a political subject of that terrain'.¹⁰ The ongoing fortification of the border is transforming the landscape through clearance, bulldozing, and building work, but this is a far from straight-forward or uncontested process.

These ideas have been developed in Geoffrey Boyce's (2016) study of the 'dynamic materiality' of the US/Mexico frontier. In that work, he calls for a 'post-humanist theory of "terrain" – one that

would account for those “conditions, forces and intensities” that at any given time “accumulate to affect, disrupt, and frustrate state practice,” independent of any human mediation’ (Boyce, 2018: 351, citing Boyce, 2016: 253; also, see Longo, 2018; Squire, 2014a, 2015). He builds on the work of Gordillo as well as my own, but takes this approach further through his rich empirical study of the frontier. Boyce recognises that earlier work grappled with related issues concerning ‘territorial integration, administration and control’, but suggests that ‘what is novel in the re-conceptualization of terrain suggested here is its appreciation for – and methodological concern with – the dynamic multiplicity of the non-human world, and the capacity this holds to actively disrupt, withdraw from or deterritorialize established relations of power. This opens up important questions for geographies of surveillance, policing, and military practice’ (2016: 254). Boyce also draws on James Scott’s *The Art of Not Being Governed* (2009), which suggests that terrain provides a ‘friction’ to human agency and state practice, rather than an absolute barrier, a theme which has been taken up by John Protevi (2019) in his recent short book, *Edges of the State* (also, see Hawkins, 2020; Scott, 2017).

The relation of the built environment to the landscape in the United States’ southern border is similar to the way the Mediterranean is utilised by Frontex as Europe’s southern border. As Nick Vaughan-Williams argues, ‘the exposure of “irregular” migrants to life-threatening conditions arising from the hostility of environments in which they are abandoned is intrinsic to the operation of the sovereign ban: the active use of these environments forms part of a broader biopolitical strategy of governance that attempts to police unwanted populations and render them immobile’ (2015: 66). As he continues: ‘the very materiality of the Mediterranean and Aegean seas and their potentialities for shaping regimes of (im)mobility can be read as forming part of a wider assemblage of human and non-human forces that play a fundamental role in the contemporary performance and reproduction of Europe’s borders’ (2015: 66; see Bialasiewicz, 2012; Kovras and Robins, 2016). The political materiality of

borders has also been the focus of some important recent work from anthropology (Demetriou and Dimova, 2019).¹¹

There is also the physical production of territory, with striking examples of states using sand, concrete, and other materials to build islands and extend the boundaries of the state through large-scale infrastructure projects. Striking examples can be found around Singapore (Comaroff, 2015), Macau, and Dubai. A recent example is in Hong Kong, which is building one of world’s largest artificial islands.¹² Even more politically charged are the artificial islands being built in the South China Sea, where a foothold of land territory can give strategic, if not always legal, control of the surrounding water.

But these kinds of transformations of territory, and the interrelation of the geopolitical and the geophysical, do not just happen at the boundaries of states. States and other actors have long transformed their territory, whether it be damming rivers for reservoirs or power generation, or draining swamps for building work or agriculture, which may also require irrigation and building transport infrastructure such as roads, railways, canals, air and sea ports, tunnels and bridges, extraction of resources, regeneration of brownfield sites, or rewilding. Landscape architecture has long analysed these kinds of transformations (Morrish, 1996; Sanjuán, 2019).

Chandra Mukerji’s (1997, 2009) work is exemplary in discussing these themes, both in *Territorial Ambitions and the Garden of Versailles* and *Impossible Engineering: Technology and Territoriality on the Canal du Midi*. Other important studies include Olivier Razac’s (2009) work on the transformation of landscapes with barbed wire, Andrew Barry’s (2013) work on the Caucasus pipeline, and Mark Usher’s (2019) work on drainage infrastructure and governmentality in Singapore, what he calls the ‘conduct of conduits’. As Thomas Sigler describes it, this is the ‘territorial palimpsest’ (2014: 897), spaces that are made and remade by human agency and physical processes. Territory is continually remade by a range of practices, nor just bordering and fortification at the divides between states, lines that were themselves the product of conquest or loss at some historical moment, but also through

surveying, mapping, engineering, logistics, operations, and other political technologies.

Thinking about the malleability of terrain can be done through a number of examples of how the physical and the political landscape interrelate. Sometimes this concerns the moving of border lines, where a political-legal line on the landscape did not coincide with physical features of that landscape. The movement of rivers in a landscape can create these kinds of problems, whether as a result of dredging works as in a recent Belgium-Holland case, or through more natural processes. Similarly, coastlines change as a result of erosion, sea-level rise and reclamation projects, glaciers and sea-ice can melt, deserts can shrink and grow, and marshes and deltas equally blur any straightforward distinction between land and sea. While the old idea of 'natural boundaries' has long been discredited, most boundaries do use at least some features of the landscape – rivers, coastlines, mountains, deserts – and sometimes etch their legal-political line onto the physical terrain. There may be nothing natural about boundaries, but there are a number of intersections of nature and boundaries (see Fall, 2005, 2010). If the geophysical landscape is increasingly malleable, then this malleability complicates the ways in which states might fix their boundaries that mark the edges of their territories. They can also feature in terms of the internal aspects of the territory of states, rather than just at their borders. These issues operate above and below the surface, both the sub-soil and the submarine, requiring a three-dimensional study, and do not operate on a fixed land-sea distinction. Physical processes, often sped up by the climate change caused by global warming, are transforming territory.

It is obvious to say that rivers meander, that glaciers melt, mountains erode, coastlines change, that islands can be submerged, that deserts can shrink and grow, that deltas, swamps, and marshes complicate a simple land/sea divide. And yet, so many of our theorisations of political-legal territory mask these factors. One indication of the changing nature of this question is that the Intergovernmental Panel on Climate Change (IPCC) has recognised the 'risks to territorial integrity' that are likely to result from climate change (Field et al., 2014: 20, 73, 758, 775).

On glaciers in this regard, we now have an in-depth study of the Italian-Austrian boundary line, which follows a watershed, and is now reconceptualised legally as a moving border. This is the work of the Italian Limes project (Ferrari et al., 2019).

The concept of 'terrain' can therefore encompass many of the concerns for which notions from volume, volumetric, voluminous, sphere, and milieu to materiality were proposed. Terrain is obviously material, and it takes into account depth and height as well as the flattened cartographic imagination; volume not just area. It also avoids some of the vitalist associations of the notion of milieu, but nevertheless helps us to think about the relation of the built and geophysical environment, of the transformations states and other actors make to their territories, even as they are constrained by them. Although terrain has an established sense in geography, which the next section of this article will discuss, it has the potential to move beyond simply being dry land, and to understand the relation of land to water in indeterminate and dynamic environments – of which examples would include rivers, deltas, estuaries, swamps and marshes, glaciers, and sea ice. This extension to use the notion of terrain to think about water as well as land might be seen by some as problematic, but terrain can, in this expansive sense, perhaps begin to challenge the material divisions that structure the legal-political regimes of land, sea, and airspace. Perhaps most usefully, terrain is helpful because it combines at least two fundamental registers – the material and the strategic, the physical and political dimensions of geography.

It is for all these reasons that I suggest that terrain is the best concept we have for understanding the political materiality of territory. This materiality is not a static product of some previous process, nor is it some material element to which processes happen. Rather, terrain is itself a process, continually made and remade, transformed by geophysical and human transformations. Terrain therefore acts a supplement to theorisations of territory; it forces them to account better for the physical, material nature of the spaces to which human actors lay claim, which they live in and shape.

The legacy of terrain in military and physical geography

There are certainly some problems with the use of ‘terrain’ to capture this way of thinking about the political materiality of territory. As we know, terrain as a category has traditionally been associated with physical geography as well as military geography. There are some associations with both of those approaches which are problematic to this kind of way of thinking about terrain.

The Prussian General Carl von Clausewitz analysed terrain in relation to the military in his famous book *On War* of 1832. He suggested that ‘Geography and ground [*Gegend und Boden*] can affect military operations in three ways: as an obstacle to the approach, as an impediment to visibility, and as cover from fire. All other properties can be traced back to these three’ (Book 5, Chapter 17, 1984: 348).¹³ He notes that his discussion is of ‘the full meaning of the French term *terrain*’, and at times uses *Terrain* as a German word, though the section is entitled ‘Gegend und Boden’ – country, region, or area; ground or soil. Movement, visibility, and cover are the key here. Traditionally, then, military geography has looked at the way that the landscape might be utilised by or limit military operations – troop movements, strategic command of height, artillery use, supply lines, and so on. Napoleon Bonaparte was the first general to take geologists on a military campaign, though they were not used on the battlefield itself until World War I (Rose et al., 2019).

There are many useful studies of this understanding of terrain (i.e. Doyle and Bennett, 2000; Rose and Nathanail, 2000; Rose et al., 2019; Winters, 1998). That geography is, first of all, about waging war is something claimed by Yves Lacoste back in 1976, a claim Paul Virilio and others have continued to make (see Woodward, 2005: 730). Geography grew up in ‘the shadow of the military’ (*Hérodote* interviewers in Foucault, 2007: 177). Nonetheless, contemporary political geography on territory – and I include my own earlier work here – has tended to underemphasise the physical materiality of the terrain divided between political-legal regimes. This neglect of the materiality is a problem in general

terms, but especially when we consider the dynamic processes exacerbated by global warming.

Rachel Woodward (2004, 2005) importantly reversed that traditional focus of military geography. Critical of the ‘terrain and tactics’ approach, Woodward (2013) instead looks at military landscapes. Instead of asking what was the impact of the geography on the military, Woodward asks what was the impact of the military on the geography? How do airfields, dockyards, bases, barracks, firing ranges, armament factories, communication and surveillance posts, memorials, and other uses of landscape transform it, and the surrounding area? How does the military legitimate this land use and transformation? What implications does this have for the local area in terms of employment, schools, prostitution, clashes with the civilian population, and so on. Her work and associated studies have done much to set a new agenda for work in this area, a genuinely critical military geography (Woodward, 2017). Similarly, Shiloh Krupar’s (2013) work on military and nuclear toxic waste and its impact on the landscape of the US southwest is extremely helpful in approaching the legacies of military use of landscape.

But is the problem with military geography *just* that it made the first move, to analyse the impact of geography on the military, but not the second, the impact of the military on geography? What if it also worked on a limited notion of terrain? And that, while certainly reductive in understanding the relation between the military and geography, terrain is actually an underexamined notion within geography? As I will go on to suggest, it is actually a concept that is more mobilised than analysed, and not always in helpful ways.

More recently, however, work on mobilities and historical geography has been used to rethink some of the assumptions of military geography (see Forsyth, 2019; Merriman and Peters, 2017; Merriman et al., 2017; Rech et al., 2015). In this I would include Isla Forsyth’s (2014, 2017) work on deserts and camouflage, Derek Gregory’s (2016) analysis of ‘The Natures of War’, and Pip Thornton (2015) and Gastón Gordillo’s (2018) work on the battlefield. Gordillo excepted, not all of these use the language of terrain, but I would suggest they can all be seen to be

grappling with the question of the interaction of the material landscape with military action.

Additionally, the military has not just had an impact on the landscape, but also on what we know of that landscape. Technical work is crucial, including the work in surveying that made possible national mapping projects. Rachel Hewitt's (2010) biography of the Ordnance Survey is revealing, because it shows how much this project was bound up with the needs of the military, a theme also developed in Caren Kaplan's *Aerial Aftermaths*, which explores how landscapes get turned into cartographic representations, from Scotland to Iraq (2018: Chapters 1 and 4), and the more general study of the impact of cartography on territory by William Rankin (2016). In more recent developments, there is some excellent work by Jennifer Gabrys (2016) on modern technologies of remote sensing, Jess Bier (2017) on the relation between military occupation and cartographic knowledge in Israel/Palestine, Matthew Wilson (2017) on GIS, of course a technology developed by the military but also used to study urban inequality, and Antoine Bosquet (2018) on military perception from the telescope to the drone.

In physical geography, terrain has tended to be understood in terms of a specific layer above the earth's deeper rock. Terrain is related to relief, generally understood in terms of elevation, slope, and orientation of features. Terrain, then, is usually seen in terms of land form, which has an impact on water flow and distribution on and through that surface. There is also generally a distinction between topography and bathymetry for land under air and land under water (though see Childs, 2020; Forman, 2020). Both of these definitional issues therefore rest on a strict distinction between land and water. Nonetheless, it is important to recognise the importance of water to any boundary that uses a natural feature – rivers and coastlines of course, but watershed lines or glaciers in mountains, and the absence of water or its relative lack in desert regions.

Geomorphology studies the formation of terrain, whether this is through seismic activity, erosion by water or wind, or external forces such as meteorites. These land processes can shape terrain. The word 'geomorphology' was apparently first used by

Albrecht Penck in the early 20th century for the study of this process of formation (Martin, 2005: 178), though the work of James Hutton and Charles Lyell in the late 18th and early 19th century is a more crucial beginning (Goudie, 2011). Understanding terrain might be important for human settlement, agriculture, transportation or military activities, and meteorology.¹⁴

A larger question is how the notion of terrain became a relatively unproblematic notion. How did physical geography come to take terrain as land form, rather than land processes? As the work of Martin Rudwick (2005, 2014) has shown, the deep history of the earth shows a dynamic planet.¹⁵ Perhaps it is not simply problematic that the idea that terrain is land form, to which process happens, but that the distinction between form and process is itself problematic. What would happen if we collapsed this distinction?

Terrain analysis is a familiar notion, understood as the evaluation or analysis of terrain (Mitchell, 1991; Wilson and Gallant, 2000). But what if we began with an analysis of terrain, as a concept and practice? Then, if we have clarity about the notion of terrain, how might we make terrain analysis a mode of critical engagement, a way of looking at territory or political geography more generally, that does not just see terrain as the object of scientific analysis, but a concept with which we might do critical analysis. To explore this fully, we would need to step back and undertake some historical work. How could we discuss the history of terrain as a *concept*, especially in relation to physical geography? Why has terrain been reduced to the inert (as opposed to the dynamic), and to the dry – land as opposed to water? Such questions are beyond the scope of a single article but perhaps indicate some potential future lines of inquiry.

There are some very good histories of geomorphology, from Michael Church's (2010) survey to Rachael Tily's (2017, 2019) largely unpublished doctoral research employing approaches from Science and Technology Studies.¹⁶ However, there does not appear to be an account which analyses why terrain became the term used to designate land form, and when it got distinguished from land process.¹⁷ A clue might be in Church's discussion of

the shift from geomorphology in the 19th century as the historical interpretation of landscape to the understanding of the processes by which landscapes are modified in the latter half of the 20th century:

In geomorphology and, indeed, in much of earth science, the nineteenth century ended in about 1950. Up until the time of the second world war, the major questions remained the historical ones and the methods of investigation remained largely the same. The change, when it came, was in substantial measure technology driven. Airborne and seaborne surveying instruments, many initially developed for the purposes of war, gave major impetus to geophysical exploration, making available information about Earth's surface and shallow subsurface never before accessible. On land, the global extension of modern topographic mapping, the increasing availability of aerial photography and rapidly developing access to much of the terrestrial surface all facilitated geomorphological work (Church, 2010: 266).

The model for this kind of historical work could be Stefanos Geroulanos and Todd Meyers's remarkable book, *The Human Body in the Age of Catastrophe* (2018). That book looks at the First World War, and shows how various medical, psychological, and social developments can be related to experiences of psychological trauma, brain and bodily injury, and shock. Many of the key figures in mid-century medical sciences had formative experiences in that war. In a similar way, we might ask how did the Second World War, with military advances in terrain analysis, and the civilian use of military technologies of surveying, photography, and other instrumentation, together with the advent of the nuclear age,¹⁸ feed developments in understanding land form and process? These developments continued into the Cold War, both for the conflict itself, and the associated space race (see Pike et al., 2009: 19). This question of terrain, then, is an important way that military and physical geography interrelate, rather than simply that both sub-disciplines use the term.¹⁹ Further work on the question of terrain, both in the contemporary moment but also in the history of the discipline, may be helpful.

A response to Bruno Latour

On 12 June 2019, Bruno Latour tweeted: 'Yes, geography always had a physical & a human side (with many disputes in between); so had physical & social anthropology (with even more acrimonious conflicts), but until the Anthropocene, sociology had been left with no "physical" sociology. "Things" are back . . .'.²⁰ While a tweet may seem ephemeral and inappropriate for academic engagement, the claim builds on some of Latour's work in the past several years, which has been to explore what he calls 'Gaia-politics', or sometimes geopolitics, a politics of the earth.²¹ The work, which could be traced back at least as far as his *Politics of Nature* (Latour, 2004), and runs through a sequence of recent articles (i.e. Latour, 2014, 2016), finds its fullest expression in the book that developed from his Gifford Lectures at the University of Edinburgh, *Facing Gaia* (Latour, 2017b).

Latour is hardly alone in discussing the nonhuman agency of the earth, and elsewhere I have discussed some other interesting work thinking about these questions by writers such as Karen Barad, Jane Bennett, and Elizabeth Grosz (Barad, 2007, Bennett, 2010; Grosz, 2008; see Elden, 2017a, 2017b). Yet Latour is one of the most significant social theorists writing today, and his most recent book, *Down to Earth*, does raise questions that are worthy of a geographical response.

Latour suggests that 'belonging to a territory is the phenomenon most in need of rethinking and careful redescription; learning new ways to inhabit the Earth is our biggest challenge. Bringing us down to earth is the task of politics today' (Latour, 2018: back cover). But 'down to earth' is a weak translation of the book's original title, *Où atterrir?*, which is closer to 'where to land?' Indeed, Latour does give an example of a plane looking for a place to land earlier in the book. He gives the example of Captain Sully as a heroic rescuer of a plane whose original and emergency landing strips are unavailable (though this is a somewhat problematic reference to a saviour figure). In a related vein in our current predicament, we need in Latour's terms to find a way to bring us down to earth, of where to land or ground ourselves, coming back to earth. As Latour says in the book, 'To land is necessarily to

land somewhere [*Atterrir, c'est forcement atterrir quelque part*] (Latour, 2017a: 126; 2018: 99).

The site of such a landing is the core of the book. He rejects other possible terms – Earth [*Terre*], Nature, Gaia, Land [*Sol*], and World – and settles on the Terrestrial [*le Terrestre*], for now, ‘with a capital T to emphasize that we are referring to a concept, and even specifying in advance where we are headed: the Terrestrial as a new *political actor*’ (Latour, 2017a: 55–56, 2018: 40). Part of Latour’s point is that this is indeed an actor, not an inert container or framework:

The massive event that we need to sum up and absorb in fact concerns the power to act of this Terrestrial, which is no longer the milieu [*décor*] or the background [*l'arrière-scène*] of human action.

People generally talk about geopolitics as if the prefix ‘geo’ merely designated the *framework* [*le cadre*] in which political action occurs. Yet what is changing is that, henceforth, ‘geo’ designates an *agent* that participates fully in public life (Latour, 2017a: 56–57; 2018: 41).

That claim is, of course, not new to geographers. It has been there in the understanding of geography for a long time, and it is a claim many people have been making about geo-politics over the past few years (Bobbette and Donovan, 2019; Clark, 2011, 2017; Yusoff, 2013, 2017, 2018). As a small part of that argument, my work has been trying to argue more substantially for thinking about territory as a process rather than a product, as actively shaped and shaping rather than an inert container.

But Latour is pushing us further here. He is suggesting that the distinction between physical and human geography might need to be put into question. If previously they were seen ‘as if it were a matter of two layers, one superimposed upon the other’ (Latour, 2017a: 57, 2018: 41), he now suggests this may need to be rethought:

As long as the earth seemed stable, we could speak of *space* and locate ourselves within that space and on a portion of territory that we claimed to occupy. But how are we to act if the territory itself begins to participate in history, to fight back, in short, to concern itself with us [–how do we occupy a land if it is this land itself that is occupying us?] The expression ‘I belong to a

territory’ has changed meaning: it now designates the agency that possesses the possessor! . . . It seems that we are landing in the thick of geohistory (Latour, 2017a: 57–58, 2018: 41–42).²²

Latour says that ‘It is unlikely that this territory will coincide with a classic spatial, legal, administrative, or geographic entity [*unité*]. On the contrary, the configurations will traverse all scales of space and time’ (Latour, 2017a: 120, 2018: 95). Somewhat strangely, one of Latour’s key references for thinking about these questions is Carl Schmitt (2017b, Seventh Lecture), a repulsive figure whose understanding of geography in *The Nomos of the Earth* was informed by Friedrich Ratzel and Halford Mackinder, as well as his own earlier advocacy of an expansionist Nazi geopolitics (see Elden, 2010b; Legg, 2011; Minca and Rowan, 2016).

Despite his occasional references to more contemporary geography, Latour is clear that his understanding of territory is not that of the tradition. Territory for him has commonly been ‘too limited to the simple administrative grid [*quadrillage*] of a state’ (Latour, 2017a: 111, 2018: 87). This is, of course, far too simple a definition of state territory. So, the question arises: does Latour rest on a relatively straightforward understanding of territory, that we now need to go beyond? The older sense of a geographically bounded area has not been entirely superseded, though it is certainly under unprecedented threats, and many powerful states are doing all they can to protect it. But perhaps more importantly, the question of climate change is bearing on such bounded geographies:

Were we to give ourselves at last a realistic vision of our belongings, we would need a geography that we lack, a geography of the discontinuous and overlapping territories – something like a geological map with a three-dimensional view, its multiple layers embedded in one another, its dislocations, its breaks, its sinuous movements, all the complexity that geologists have been able to master for the long history of soils and rocks, but of which geopolitics unfortunately remains deprived (Latour, 2017b: 276).

How much this is true of geography in general, and geopolitics in particular, is certainly open to

question. But work on the notion of terrain is, I hope, a way in which geographers might begin to respond to the challenge made by Bruno Latour. In part – and here I am offering a provocation, or making a request – it might be where physical and human geography can work together to think about a shared issue.

In conclusion, what I am suggesting is that terrain has the potential to be a more material way of thinking about territory, or more generally earth, land, and ground, and their limits. Territory has sometimes been detached from that materiality, and taking terrain into account helps to address this absence. Nonetheless, some of the ways that terrain has been understood previously do not fully address this concern, or have difficulties of their own. Can we find a way to develop an understanding of terrain which takes its own materiality seriously, and to see that as formed and reformed *as* a dynamic process, rather than *by* processes? As with the work on the notion of volume, and my earlier work on terrain, much of this thinking has already been done by others. There are multiple resources in literature from a range of fields and subfields, much of which I have tried to indicate in this article. My challenge to geography – both human and physical geography – is that we should continue that work; my attempt at a contribution is to try to make some of those initial connections.

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Notes

1. The issue includes Endfield and van Lieshout (2020), Barry and Gambino (2020), Forman (2020), Bruun (2020), Childs (2020), and Hawkins (2020), among others.
2. See also Billé <https://culanth.org/fieldsights/introduction-speaking-volumes> and <https://www.societyandspace.org/articles/volumetric-sovereignty-part-1-cartography-vs-volumes>. Some of the challenges of this way of thinking are also explored in Derek McCormack's (2018: Chapter 5) analysis of atmospheres and Louise Amoore's (2016, 2020) work on cloud geographies.
3. The quotation is from an unpublished lecture in 2013.
4. On the problems of vitalism, see also Klinke (2019). Some contemporary work on ecology, not using the notion of milieu, might be a better model (i.e. Kirksey, 2015).
5. Unfortunately, the notion of 'human terrain', which might otherwise be helpful, was notoriously appropriated by the US military, and has its own severe complications (Elden, 2017a: 203 and references).
6. See the project website archived at <http://icelawproject.weebly.com>
7. <https://www.theguardian.com/us-news/2016/dec/07/report-us-border-patrol-desert-weapon-immigrants-mexico>; No More Deaths, <http://forms.nomoredeaths.org/en/>
8. <https://www.theguardian.com/commentisfree/2018/dec/29/the-us-government-deliberately-made-the-desert-deadly-for-migrants>
9. The entire sequence can be found at <https://www.loc.gov/item/87691867/>
10. It can be viewed at <https://theintercept.com/2016/10/18/best-of-luck-with-the-wall/>
11. On the challenges of the 'new materialism' for International Relations, see Vicki Squire (2014b) and Lundborg and Vaughan-Williams (2015). In Geography, work is widespread and defies indicative references, but see Dittmer (2017).
12. <https://www.theguardian.com/world/2019/mar/20/hong-kong-to-build-one-of-worlds-largest-artificial-islands>
13. The German text can be found online, for example, at <https://www.clausewitz-gesellschaft.de/wp-content/uploads/2014/12/VomKriege-ebook.pdf>

14. A helpful (though technical) guide to approaches and literature is Minár and Evans (2008).
15. For a glimpse of the future, see Zalasiewicz (2008); for a social reading of these issues, see Clark (2011).
16. There are also some good accounts of philosophy and the earth sciences (i.e. Frodeman, 2003; Protevi, 2013), and in environmental philosophy (i.e. Macauley, 2010), as well as a physical geography study of its philosophy (Inkpen, 2005). See also Martin (2005) and Goudie (2011).
17. Much valuable historical work has been done in the four volumes of *The History of the Study of Landforms or the Development of Geomorphology* (Burt et al., 2008; Chorley et al., 1964, 1973, 1991).
18. Church (2010: 282, n. 1) indicates the importance of the ‘development of the uranium-lead radioisotopic method began at the turn of the 20th century with the discovery of radioactivity, but was still under development until after mid-century’.
19. Contemporary developments are pursuing an ever-more quantitative approach through the notion of geomorphometry. For a guide, see Pike (1995) and Pike et al. (2009).
20. <https://twitter.com/brunolatouraime/status/1138814408178774018?s=11>
21. For a summary and discussion of Latour’s project, see Conway (2016), and the replies by Clark (2016) and Dalby (2016).
22. The phrase in brackets is not in the French. On geo-history, Latour references Chakrabarty (2002) and in Latour (2017b: 39, n. 73), Chakrabarty (2014).

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