

The Earth in Physical and Social Thought

Introduction: homeland insecurity

My country is about to be torn apart. I don't mean that metaphorically, in the sense of a social conflict or crisis of national identity. I mean it literally. The land where I grew up is formed at the juncture of the Pacific and Indo-Australian tectonic plates, two great crustal slabs that continue to graunch together with what is, in geological terms, unusual haste. This collision along the 'Alpine Fault' has thrown up a range of mountains which form the backbone of the largest island. Geologists estimate that these alps have been uplifted by 20,000 metres over the last 12 million years, and only the accompanying speed of erosion has kept their peaks just below 4000 metres. The two plates are currently locked, but when the tension between them reaches a certain level a significant readjustment will occur in the form of a major seismic event. The longer the delay, the bigger the earthquake is likely to be. And it will occur 'with no recognizable warning'. As geohazard experts anticipate:

There will be death and injuries, especially in the Alps and West Coast. Rescue services and medical services will be overwhelmed, and remain so for weeks in places ... Shaking damage and land instability will disrupt surface transport for months, tourists will be trapped, and distribution of vital supplies ... will be limited. Hydro stations will shut down immediately and may be slow to restart, power reticulation will be damaged ... Landslides into lakes and fiords may cause tsunamis, as may the collapse of river deltas in lakes or the sea ... No services will be as normal. (Davies and McSaveney, cited in Booker, 2006)

The consensus amongst scientists is that a 'readjustment event' occurs about every 250 to 280 years, with the last major rupture on the fault line occurring in 1717 – an earthquake likely to have measured at least 8 on the Richter scale. In the words of geologist Tim Davies, this means that '(t)he most likely time [for the quake] is now. The next most likely time for it to happen is tomorrow' (cited in Booker, 2006).

I live on the other side of the planet now, in a country which is, geologically speaking, relatively quiescent. But here on the rim of the North Atlantic there are also dangers. For some years, geologists have been monitoring the volcano Cumbre Vieja, on the island of La Palma in the Canaries. A series of fractures opened up on its flanks during a bout of combined eruption and seismicity in 1949. As a result, a mass of rock is now unstable and threatens to slide four metres or so into the ocean (McGuire, 2005: 12). A slump of this sort is part of the normal life cycle of any island volcano, though it may occur only once in 100,000 years. When the landslide does occur on Cumbre Vieja, and it is a matter of when not if, it will be over in a minute or two. But it will generate a surge almost a kilometre high, waves that will still be many tens of meters high by the time they strike the islands of the Caribbean, the coast of north-west Africa, Brazil, the eastern seaboard of the USA and Western Europe (McGuire, 2005: 19).

It has been suggested that the offending rock face could be quarried away to reduce its impact. As volcanologist Bill McGuire has roughly calculated, even if the material was amenable to being shovelled out, and could be done so at the rate of a 10 cubic metre truckload every minute of the day, it would take somewhere between 10 and 35 million years to safely excavate the potential slip (2005: 132). Despite the mass of the unstable rock, La Palma is not a large island, and in terms of the earth's history, this would be, in McGuire's terms, 'a relatively minor geological event' (2005: 15). Unlike the rupture of Aotearoa New Zealand's Alpine Fault where periodicities are relatively well understood, there is much more uncertainty about the timing of this event. The cliffs of Cumbre Vieja may well hold fast for tens of thousands of years.

We hardly need speculations to remind us of the consequences of the earth mobilizing itself, of the collisions of its own temporalities and spatialities with the times and spaces of human life. From the Indian Ocean Tsunami to Pakistan's recent earthquake, from Haiti to Chile, media audiences across much of the world have witnessed the aftermath, and sometimes the very unfolding, of naturally triggered catastrophes that have cost hundreds of thousands of lives. There is nothing new about the precipitating forces, but there is no precedent to the degree of exposure we now have to the suffering of others. The same vectors and networks that allow us to see the faces of distant people caught up in world-shattering events also enable us to offer sympathy and assistance, if we chose. But these forms of connectivity and flow also implicate us in the lives of those who are

physically far away in more mundane but no less momentous ways. Why some of us have resources to give, why others are more vulnerable to earth processes than we may be, has a great deal to do with forces of social, economic, cultural and technological globalization that bring us together and hold us apart in new and complex ways.

Just as global interconnectedness has emerged as an integral topic in social science research over the last few decades, so too has planet-scaled integration and interactivity been a unifying theme in the earth sciences for more than 50 years. While social scientists have been demonstrating how human activities in one locality have repercussions for other places near and far, earth scientists have been showing how physical phenomena that manifest themselves in one part of the world are implicated with processes operating across the planet, beneath its surface, even beyond its circumference. Whatever disciplinary divisions endure in the corridors of learning, research and policy-making, nearly everybody these days agrees that it makes good sense to look at the dynamics of the social and physical worlds together. But it's much harder to reach agreement about how best to do this, where to start, what weighting to give the respective forces and processes, how to bring very different elements into the same storyline. It's difficult enough for social scientists, humanities scholars or earth scientists to come to a consensus amongst themselves, let alone to reach across meta-disciplinary divides – and a whole world of jostling interests and values – to attain some shared planetary vision.

This chapter looks at the diverse imperatives towards thinking 'globally' in contemporary Western thought. In broad strokes, I sketch out some of the possibilities for and impediments to thinking about our planet in an integrated way. I begin by looking at how a select group of philosophers and social theorists laid out the challenge of thinking through and about the earth, and then address the different ways that the social sciences and earth sciences have approached the issue of globality, before returning to some relevant themes in recent philosophy. And then I come back, once more, to considering what is at stake in sorting out our collective relationship to the dynamic planet which remains our only home.

The equivocation of the earth

Some two decades ago, in an early philosophical engagement with human environmental impact on 'a physical system millions of years

old', Michel Serres highlighted the need to confront these issues at the same spatio-temporal scale as they are playing out. '(W)e must decide about the greatest object of scientific knowledge and practice, the Planet Earth', he proposed (1995: 30). Still further back, on the cusp of the emergence of modern environmental concerns, social theorist and philosopher Henri Lefebvre surveyed the cultural milieu of his time, conceding that images of nature had been excessively reproduced and the very concept of nature trivialized. 'And yet', he mused, 'the notion of nature has not been exhausted. It is still buoyant. It still has a few metaphilosophical or philosophical surprises in store for us' (1995 [1962]: 132). Lefebvre noted that ways of thinking about 'matter', 'things' and 'objects' allow the issue of nature to be articulated in clearer, less confused ways, but in the process lose something of the richness and complication that lends the concept of nature its continuing relevance. Recognizing all the ideological risks of a unified vision of a world or universe, Lefebvre nonetheless advised the materialist critiques then on offer not to dispense with the challenging questions arising out of the interplay between nature as a ground and as an object. As he counselled: 'there is one fact which this critique must be careful not to overlook: we have before us, here and now, a whole. It is both the condition for production and the product of action itself, the place for mankind and the object of its pleasure: the earth' (1995: 133).

As Lefebvre's comments notify us, the earth did not have to await any awareness of material despoliation in order to emerge as a theme of theoretical analysis and speculation. Already, in the earlier twentieth century, prior to the crystallization of discourses of global environmental crisis, the earth was construed as problematic – as 'under threat' in an experiential or phenomenological sense. Western philosophy has a history of inquiring about 'the ground': which is to say that it engages with foundations or originating forces, including the generative and supportive conditions of an intelligent being. Over the course of the last century, philosophers increasingly turned their attention to worldly changes that have affected our experience of the ground, focusing especially on techno-cultural transformations that seem to disturb our sense of stability and anchoredness.

In his first major published essay, Jacques Derrida (1989 [1962]) zeroes in on the question of what to make of the earth in our time. The work is an extended introduction to phenomenologist Edmund Husserl's *Origins of Geometry*, and it offers a still resonant point of entry to the issue of why the earth is troublesome for social and philosophical thought, even without the surcharge of ecological crisis.

Derrida looks at how the modern experience of the earth pulls in two irreconcilable directions. Following Husserl, he notes how the Copernican and Newtonian view of the 'geometrical' earth – as one amongst a system of similarly spherical, orbiting bodies – constitutes the planet as an object; graspable, accessible to thought. This is the earth that anyone schooled in elementary astronomy knows to be revolving around the sun: the third rock from the sun – celestial neighbour of Mercury and Venus. And yet, as Husserl famously responded to the standard scientific interpretation: 'The original ark, earth, does not move' (cited in Himanka, 2005: 621). By which he meant not that Copernican science had it wrong, but that our primary experience of the earth is as a supportive and sustaining ground – as the resting point from which we register the movement and thingness of all other things. The earth cannot simply serve as one astronomical body – one object – amongst others, as it is the very condition of our encountering of everything else. For Husserl, as Derrida explains: 'the earth ... is the *exemplary* element (being more naturally objective, more permanent, more solid, more rigid, and so forth, than all other *elements*; and in a broader sense it comprises them)' (1989: 81, author's italics).

In a move which prefigures much of his subsequent work, Derrida dismisses neither Husserl's return to an earth radically at rest, nor the scientific objectification of the planet. Suggesting that they are neither totally exclusive nor fully reconcilable, he shows how both dispositions work to destabilize or contaminate the other:

the possibility of a geometry strictly complements the impossibility of what could be called a '*geo-logy*', the objective science of the Earth itself ... The Earth is, in effect, both short of and beyond every body-object – in particular the Copernican earth, as the ground, as the here of its relative appearing. But the Earth exceeds every body-object as its infinite horizon, for it is never exhausted by the work of objectification that proceeds within it. (1989: 83, 85)

To put it another way, just as the most 'grounded', nature-loving modern knows that our planet is spinning relentlessly around the sun, so too does the career astrophysicist wake up trusting that their house or their observatory will sit as it did the day before, anchored to the ground, beneath a familiar sky. No conversance with the scientific facts can ever entirely displace this visceral trust in earth, sky, life and water, and no amount of tree-hugging or nature poetry can fully efface the mental image of circling spheres. Each of these experiences is a part of modern life and understanding, and each insinuates itself in the other, Derrida is saying.

But whilst Derrida accepts that the ‘world objectivation’ of the physical sciences cannot completely override the basic kinaesthetic experience of having our feet planted on the earth, he breaks with Husserl over the question of how we access or experience this terra firma. Husserl believes that the objective scientific interpretation is novel and superficial, and detracts from our core human experience of groundedness. Thus, we ought to burrow beneath science’s crass new factuality, and peel off its layers of artifice and abstraction in order to unearth a substrate stable enough to provide ontological certainty, in the hope that this primordial experience might gather us together and reunite us over all our differences. Whereas for Derrida, in the gesture that made his name, there can be no pure presence of the solid, enduring earth. There will be no ‘unity of all humanity ... correlative to the unity of the world’ (1989: 84, footnote 87). Instead, the true nature of the ground beneath us or the sky above us is never finally revealed. They withdraw from us, retain the secrets of their own emergence, continuity and destination: ‘... preculturally *pure Nature* is always buried’ (1989: 81).

In another few years, Martin Heidegger (1976) will have caught sight of photographs of our planet snapped by astronauts – and condemned them as the final blow in the uprooting of humanity; the conclusive technological undoing of the capacity of the earth to provide a supportive and gathering ground (Turnbull, 2006: 126). But so too will the environmental crisis have added its seemingly irreversible charge to the problematization of the human experience of the earth. The problem from here on in, as John Caputo puts it, is that ‘we have not only disenchanting the forest but deforested it too’ (1993: 34). Worse than being reduced to an object or a ‘standing reserve’, our planet becomes a threatened object, a depleting reserve. And this palpable undoing of the earth by our own hands sets it equivocating in new, unprecedented ways.

The point that Derrida and subsequent post-structural critics made about Husserl, Heidegger and similarly melancholic musings over the loss of the ground was that what was really at stake was the loss of philosophy’s ability to shore up its own foundations. And in particular, the waning authority, not so much of the earth, but of specific cultural and national territorializations of the earth to provide this anchoring.

But there’s something else to keep in mind. At the historical moment when Derrida was engaging with Husserl, claims that the earth was ‘permanent’, ‘solid’ or ‘rigid’ had a meaning that was about to be compromised. A ‘metaphilosophical surprise’ was in store, and

it did not have to wait on any indictment of human activity. In just a few years' time, accumulating scientific evidence would confirm the theory of plate tectonics – the key to conceiving of the earth as a single, integrated and dynamic physical system. We might see this as the Copernican turn coming home. In a similar way that the astronomical sciences had once informed us that we inhabit an orbiting spherical body, the earth sciences – from the late 1960s onwards – would tell us a coherent and more-or-less consensual story about the inherent tendencies of the earth's crust to shift and buckle, about the normality of periodic upheaval and the ordinary instability of the ground beneath our feet.

The earth science story about an intrinsically restless planet is not opposed to the human-induced environmental degradation story. At least it shouldn't be. For it is the pronouncements of physical science that enable us to understand how and why human forcings change the earth's weather, water, soil or life. However, with regard to the ontological, experiential and political dimensions of inhabiting the planet, these discourses can pull in very different directions. In both senses, the radical rest of the earth – Husserl's 'original ark' – is in for an upset. But an inescapably volatile earth and a planet 'we' ourselves have made unstable do not have the same implications for how we think about human agency. And what to make of human agency remains a definitive concern of the social sciences.

Lost planet? Social thought and global nature

Social scientists and cultural theorists have their own deep-seated disciplinary motivations for disavowing the idea of an originary and anchoring earth. They have long assumed, often justifiably, that accounts of human behaviour which make recourse to naturalistic causes diminish the purchase of social or cultural explanations and thereby undermine the potential for human agents to take responsibility for shaping their own worlds. This congenital antipathy to attributing causal efficacy to nature goes a long way towards explaining social and cultural inquiry's initially slow reaction to the environmental predicament of the latter twentieth century. In order to engage with the materiality or physical dimensions of the 'ecological crisis', it was first necessary to find ways of articulating human-induced destruction or perturbation which did not appear to valorize the bio-physicality under threat.

This was achieved both by constantly circling back on the issue of the cultural investment in particular constructions of nature and by making the claim that, in its very materiality, nature had ceased to be available for direct communion or foundational experience. 'In this actual world there is ... not much point in counterposing or restating the great abstractions of Man and Nature', wrote cultural theorist Raymond Williams. 'We have mixed our labour with the earth, our forces with its forces too deeply to be able to draw back and separate either out' (1980: 83). Or as geographer Neil Smith asserted, surveying the cumulative effects of ever-expanding forces of production: 'No God-given stone is left unturned, no original relation with nature unaltered, no living thing unaffected' (1984: xiv).

The claim made by Williams, Smith and others that what used to be known as 'nature' is now so thoroughly modified by socio-technical processes that it can no longer provide an external platform from which to pronounce on the state of human sociality has had an irresistible appeal to subsequent critical social thinkers. It at once treats the environmental predicament with deadly seriousness, and shrewdly turns this predicament around so that it bolsters rather than undermines the resistance of social and cultural thought to the natural referent. But it's worth noting that this is not the same thing as saying, along with the early Derrida, that 'preculturally *pure Nature* is always buried' – for it is much more than a matter of nature not being *experientially* or *cognitively* inaccessible in any direct, unmediated way. It's about this nature being physically transformed *out of existence*.

The idea of the 'end of nature', in its various guises, paved the way to drawing environmental problems and technological hazards into the heart of social theories of globalization. When globalization established itself as a key concept in the social sciences in the closing decades of the twentieth century, it was construed almost entirely as a social process, albeit it one with a range of environmental or other biophysical consequences. Critical social thinkers were at pains to avoid all association of the 'global' in globalism, globality or globalization with nature, so as to head off any suggestion that the particular forms of world-encompassing order then on the ascendant were a 'natural' outgrowth of a human expansionary drive or an inevitable outcome of our 'planetary' domicile (see Law and Hetherington, 1999).

But the rise of environmental or technological problems that appeared inherently transboundary in their make-up, together with a more general ecological predicament that seemed paradigmatically

'global' in its manifestations, demanded something more than a blunt denaturalization of globalization. Even before the ascendance of climate change as the overarching threat to the 'global environment', issues were shaping up in ways that demanded social analysts to take account of properties and potentialities of 'actors' other than the human. Earlier manifestations of the end-of-nature argument began to appear overly monolithic in their narration of nature's eclipse, and variations on the theme turned towards the propensity for generative and unpredictable behaviour that characterized non-humans as much as it did their human counterparts. Although distinct in other ways, Ulrich Beck's 'risk theory' (1992, 1995, 1999) and Bruno Latour's 'actor-network theory' (1993, 1999a) both drew attention to the inherent reluctance of other-than-human elements to hew to the grids and groves we humans lay out for them, and proposed that this was a key as to why environmental or technological problems are so complex.

For a new generation of critical social and cultural thinkers engaging with nature–society questions, then, three interrelated themes have come to the fore. First, in the contemporary world, human agents are probing ever more deeply and intricately into the workings of nature, and recruiting more and more extra-human elements into our machineries and circuitries. And we are doing so with undue haste and inadequate care. Second, the nonhumans which play a constitutive role in these arrangements do not necessarily stick to the agendas we set them, and thus exacerbate the overall state of precariousness and unpredictability. And third, the whole process of enrolling ever more diverse entities in ever more extensive networks – and all its attendant risks – is increasingly global in scope.

In this way, what were formerly addressed separately under the headings 'nature' and 'society' are both revealed to be heterogeneous compositions – forged out of complex, shifting permutations of human and physical ingredients. Importantly, this means that it is not only 'society' that might be organized differently, as politically progressive thinkers have long imagined, but 'nature' also. If the natural and the social have become so inextricably bound together that they now comprise a single 'hybrid environment', then the transformation of society and the transformation of nature are effectively one and the same process. Given the claim that there is no longer any uncompromised 'external' nature, then logically there is no aspect of physical existence which is not potentially open to being reworked in some way. As geographer Eric Swyngedouw puts it: 'The key political question is one that centers on the question of

what kind of natures we wish to inhabit, what kinds of natures we wish to preserve, to make, or, if need be, to wipe off the surface of the planet ... and on how to get there' (2007: 23).

No one is suggesting that 'nature' – or rather the multiple, hybridized nature-cultures that now serve as our realities – will ever submit to total control, for it is routinely acknowledged that arrangements of such complexity are incapable of having an order or logic imposed upon them. But the assumption that all of reality is now in some sense 'negotiable', even if it is not always spelt out as such, is a remarkable one. And it needs to be carefully scrutinized. I will be addressing this more closely in the next chapter, but for now I want to rough out what's at stake in the idea of 'global natures', and especially what it might mean for thinking about the earth as an entity or as a ground.

If we think back to the challenge of bringing the question of nature and its destabilization into discourses of globalization, it is apparent that there is a dilemma here. Critical thinkers perceived a need to engage with physical processes and nonhuman entities at the scale of the globe, and yet did not want to re-invest in a concept of nature which might restrict the possibility of globalization being open to alternatives. This challenge seems to have been met by way of imagining 'global natures' or hybrid nature-cultures that have rich and active lives of their own, yet are effectively untethered from the 'earth', 'the biosphere' or any other pre-existing geophysical entity. By concentrating on the concrete processes by which physical or nonhuman entities are uploaded into novel globe-spanning constellations, the new critical nature theorists keep their focus firmly fixed on forms of globality that are orchestrated by human associational and techno-cultural capabilities, while leaving leeway for the non-human to assert or insert itself. As geographer Bruce Braun helpfully sums up:

For many writers the key concern has been making these geographies (of 'global' nature) visible and understanding the practices and processes that compose them, from technological innovations, transnational trade agreements and the local-global practices of environmental groups, to the lively materiality of the non-human 'stuff' of nature, which brings its own spatial forms and logics to the story. (2006: 644)

Or as Latour puts it, rather more bluntly, when talking about the globality of nature: '*global* is largely, like the globe itself, an invention of science' (2004a: 451).

Natures, then, in the language of contemporary critical social and cultural thought, are 'multiple' and 'situated'. They can be put together or composed in many ways, and the components out of which they are assembled, for all that they may issue from particular situations or contexts, are increasingly likely to be mobilized over long distances. What we need to keep our eye on here is the repeated insistence that there is no outside to the new hybridized environments: thus no functionally intact nature enduring beyond, beneath, amidst or after this assimilation. The claim about the end of nature's exteriority and the story of an all-subsuming rise of new technologically mediated global nature-cultures make for an extremely potent combination. It is a fusion, I want to argue, which discourages any political or ontological investment in a geo-physical materiality with an autonomy and integrity of its own.

Effectively, the new hybrid social-physical topologies are presented as self-supporting. They are shown to be composed, step by step, link by link, out of every conceivable component, but they do not appear to require a substrate. They have no ground, in other words. Unless, that is, we go so far as to consider humanly instigated networks as the underpinning or foundation of nature.

In this way, whether intentionally or as a more subtle performative effect, the bold new commitment to global natures is resulting in a marked reluctance to confront the question of the earth as an autonomous entity – or as the ground out of which humans and other beings emerge. Indeed, the earth as an object of interest at all seems to be largely precluded, at the very time when just about every other conceivable object, from door knobs to space shuttles, is on the agenda.

As we will see when we turn to the recent history of the earth sciences and to developments in continental philosophy, there is more than one way (unsurprisingly) to conceive of the multiplicity and situatedness of nature. Before leaving social and cultural thought, I want to return to Raymond Williams, who is so often cited for his contribution to the end of a certain way of conceiving of nature. A few pages on from his canonical adieu to the 'great abstraction' of Nature, Williams called upon his audience '(t)o re-emphasize, as a fundamental materialism, the inherent physical conditions – a specific universe, a specific planet, a specific evolution, specific physical lives – from which all labour and all consciousness must take their origins' (1980: 108). This is the end of nature not simply by way of its ascendance into new networks or assemblages, but as the prelude for a profound and substantive return to the earth.

Earth science and planetary dynamics

To follow an account of recent thinking about nature in social thought with a parallel precis of the earth sciences is to tell a tale of two globalizations. Roughly contiguous in the timing and scoping of their concern with the global; resonant in their shared use of tropes of connectivity, complexity, multiplicity and uncertainty; convergent in their anguish over human impact on terrestrial environments – social-scientific and geo-scientific globality look at first glance to have been made for each other. And yet, I want to argue, they are near antithetical in their broader implications, and are being held apart by this largely unspoken dissonance at the very moment when their rapprochement is most urgently needed.

As numerous overviews concur, the last 50 or 60 years of research in the earth sciences has fitfully but cumulatively transformed the scientific understanding of our planet (Davis, 1996; Wood, 2004). Step by step, project by project, debate by debate, a whole range of processes and components that were previously addressed in sub-disciplinary or regional specialisms have been assembled into a new conception of the earth as an integrated and dynamic system.

The key to the emergent global vision of contemporary geoscience, most commentators agree, was the confirmation of the theory of plate tectonics in the late 1960s (Davis, 1996; Westbroek, 1992: 53). The crucial event – a fortuitous offshoot of projects prompted by cold war rivalries – was the discovery that the ocean floors were bisected by extensive mountain chains (see Menard, 1986). These submarine ranges turned out to be the sites at which crust-forming magma pumped out of the planet's interior. Subsequent research established that liquid rock welled up at these deep-ocean spreading centres, that it hardened and moved outwards, eventually rising into continental landmasses whose ultimate fate was to be forced underground once again by the pressure of new crustal formation (Colling et al., 1997: 114–15; Smil, 2003: 116–21).

In this way, a story took shape in which the earth's crust was in constant motion: the new global tectonics providing a unifying schema through which all regional geological processes could be viewed as manifestations of a unified and continuous cycling of the planet's entire lithosphere. This was a transition that implied a radical reassessment of earthquakes, volcanoes and other geophysical upheavals. No longer envisaged as exceptions to a normal state of quiescence, such events came to be accepted as ordinary and inevitable expressions of the earth's unceasing crustal dynamics.

The acceptance of the theory of plate tectonics was followed by a cascade of further discoveries and amalgamations. Building on the conceptual suturing of the basic componentry of hydrosphere, lithosphere and atmosphere, research in the 1970s and 1980s homed in on the interactions between the most important chemical constituents of the outer earth. The emergent meta-discipline of geochemistry forged itself around explorations of the principle reservoirs of carbon dioxide and free oxygen, sulphur and carbon, and the silicate minerals contained in the basalts, granites and other rocks that emanated from the deep earth (Westbroek, 1992: Ch. 4; Smil, 2003: Ch. 5). Once again, the focus was unequivocally global, as geoscientists tracked the channelling of key elements back and forth through their atmospheric, lithospheric and hydrospheric sinks. Along with these planet-scaled couplings, researchers also mapped out a range of complex reticulated exchanges that enmeshed each of the main cycles into a single encompassing 'geo-chemical' system (Westbroek, 1992: 93; Wood, 2004: 90).

In consort with the new geophysics, this globalist chemistry would come to serve as the mainstay of the modelling of climate at a global level. There were other major components of the outer earth that also called for full consideration. Growing interest in Antarctica, during and after the International Geophysical Year of 1957–8, gradually drew *ice* – or rather, the 'cryosphere' – into full conversation with the other dominions of the whole earth system (Pyne, 1988; Macdougall, 2004). Ice ages had long been considered epochal events in the shaping of the earth's surface features and in the periodic rebooting of biological succession, but the new glaciology, plumped with polar paleoclimatic data, helped to redefine ice sheets as 'interesting, dynamic systems, full of feedback mechanisms' (Pyne, 1988: 287). Glacial episodes came to be construed as key players in the planet's overall self-regulation, the new grasp of their machinations helping to draw the earth more closely into the domain of astrophysical movements and rhythms (Pyne, 1988: 287).

While great slabs of rock or ice have effectively become more mobile and active, life has come to be seen increasingly as a weighty and momentous force in the moulding of the earth. For a number of reasons, biological life arrived late at the new planetary synthesis. Even where the will was there, the entangled flows and trajectories of living matter have proven more of a challenge to large-scale quantification and mapping than physico-chemical elements (Westbroek, 1992: 65). Perhaps also, alongside the hurdle of inherited boundaries between life and earth sciences, biology's own long-standing

privileging of more conspicuous multi-cellular organisms at the expense of the much older, metabolically wider-ranging and far more prolific microbial kingdom has held back a fuller appreciation of 'life as a geological force' (Westbroek, 1992; Margulis, 2001).

In the 1920s, the Russian mineralogist Vladimir Vernadsky (1998 [1926]) had already developed the idea that biological life – or what he preferred to term 'living matter' – played a central role both in mobilizing the mineral elements of the earth's crust and in determining the composition of the atmosphere. Popularizing the term 'biosphere', he not only proposed that all living things meshed into a unified and dynamic planetary force, but also stressed the extent to which the enveloping sphere of terrestrial life was an expression of the earth's openness to the energies of the solar system (Smil, 2003: Ch. 1). The resurgence of interest in life as a prevalent element in the generation and maintenance of the planetary system half a century later was also sparked by the consideration of earth in relation to the wider solar system. It was in the light of work with NASA on the probability of finding living things on the earth's neighbouring planets that geochemist James Lovelock (1987), independently of Vernadsky, arrived at his own theory about the integral role of biological life itself in sustaining the earth as an environment fit for living things.

While Lovelock's depiction of the earth system as a sort of super-organism has ruffled scientific sensibilities, there is broader support for his argument about the capacity of the biosphere to function homeostatically in response to perturbations of the earth – including significant changes in the solar flux (see Smil, 2003: 230–1). What became known as the 'Gaia hypothesis' has been greatly fortified by microbiologist Lynn Margulis's evidence about the unique role of the microbial life in establishing the biosphere and her arguments about their continued prominence in mediating major earth processes (Margulis, 1998: Ch. 8; Hird, 2009: Ch. 6).

Despite the continuing contentiousness of Gaia theory, the idea that living organisms and their global environment form a tightly coupled system has encouraged interdisciplinary researchers to take account of the biosphere as a major geochemical reservoir and to consider the global cycling of life alongside that of rock, water and air (Smil, 2003: 231; see also Schneider and Boston, 1991; Bengtsson and Hammer, 2001). Together with other ongoing issues (such as the significance of the planet's energetic and material openness to the cosmos), questions around the role of life's co-implication with other earth-shaping forces are indicative that the integrative approach to the earth is still evolving. Even so, the last 50 or 60 years

of earth science offer plentiful evidence that a major shift has already occurred in the way scientists conceive of our 'specific planet'. As physical geographer Dennis Wood sums up, prior to this succession of developments, the standard view was that:

Things ... *touched*. They sort of pushed each other around. But there was none of the sense of interpenetration, of multiple causation, of feedback, of mutual interdependencies, of ... *the structural coupling* that is the essential characteristic of our situation as we understand it today. (2004: 69–70, author's italics)

It is the geosciences' escalating ontological commitment to the globality of their objects of inquiry that has enabled the comprehension of the earth's climate dynamics to reach its current level, including the awakening to the possibility of abrupt changes in climatic regimes at the planetary scale. After some debate, many earth scientists have come round to the idea that human forcing of climate is now substantial – and substantiated – enough to mark an epochal shift out of the Holocene and into the 'Anthropocene' (Crutzen, 2002; Davis, 2008). But if such a pronouncement is taken by critical social scientists to be supportive of their case for an ultimate 'end of nature', in the earth sciences it is more likely to be read as an affirmation that our species belongs among other biological and geophysical forces.

Similarly, there is an apparent convergence between a nascent social scientific uptake of complexity theory and a more established natural scientific turn towards understanding the behaviour of physical systems by way of complex, nonlinear dynamics generalizable over a range of different contexts or fields. Sociologist John Urry (2003, 2005) and fellow transdisciplinary-minded social theorists may well be onto a promising line of inquiry when they point to a potential convergence between the social and natural sciences as a way of grappling with the dynamical properties of a densely and heterogeneously interconnected globe – one in which physical and social elements are inextricably bound together.

But this is where we need to be sensitive to the differences in the way that globality is currently being imagined in critical social thought and in the earth sciences. Social science discourses on complex, hybridized nature-cultures, I have argued, wager on the co-constitutive relations of the social and the physical – and discourage thinking in terms of natural systems in which the human imprint is negligible or non-existent. No less than the social sciences, the earth sciences invest in a version of relationality, one in which observable

realities are understood in terms of inextricable entanglements, mutual interdependencies and co-constitutive relations. They too have a strong sense of 'multiplicity', especially with regard to the recognition that complex earth systems and sub-systems are capable of moving between alternative states (none of which is afforded preferential treatment over others) as well as having the capacity to generate entirely novel forms of organization. And they also go to great lengths to 'situate' the earth in its current manifestation – both in terms of its own eventful history and in the broader context of an evolving cosmos.

Aside from the relatively restricted spatio-temporal span in which humans make their presence felt, however, the complex global 'co-enactments' of interest to earth scientists occur without input from our species. Not only is it absolutely crucial to any understanding of earth processes that major rhythms, cycles and singular trajectories reach far back beyond any human presence, but it is also routine to track causal processes well beneath the inhabited surface of the earth and beyond the planet into the solar system or further.

For all that they intersect or overlap at significant junctures, then, the deep temporal and extended spatial sensibilities characteristic of earth science 'globality' pull in very different directions from the enthrallment with co-present entities that currently prevails in progressive social and cultural thought – in ways which I will be further exploring in the following chapter.

Much of the recent reassessment of nature in critical social science and cultural theory takes inspiration from post-war continental philosophy. In this regard, the assaults on totality, closure, universality and foundationalism which are perceived to be definitive gestures of post-structural philosophies have been especially pertinent. With this in mind, I return to the question of the earth in some influential currents of recent philosophical thought, picking up where Derrida's critique of Husserl left off. What kinds of globality, I ask, do the livelier currents of philosophy deal in – and how do their takes on the earth articulate with those of the social and earth sciences?

Continental philosophy and the ungrounding of the ground

The shift towards taking heterogeneous 'materialities' seriously in the social sciences is in many ways a reaction against the prioritizing of cultural, discursive and linguistic themes in some recent fields of social and cultural inquiry. This so-called 'cultural turn' – with its

characteristic thematizing of the indeterminacy of meaning, identity and representation – itself drew inspiration from an interest in systems of language and communication in 1950s and 1960s continental philosophy: a concern that played an important part in the shaping of post-structuralism (see Johnson, 1993: 1–3). I want to set out from this conjuncture – not only because of what it tells us about later engagement with physical processes in philosophy, but for what it reveals about the strange (and unfortunate) destiny of the thematic of ‘writing’ or ‘sign play’ over the course of its uptake into social and cultural thought.

For a number of key French philosophers, it was the achievements of post-war biology – especially the deciphering of the genetic code – which inspired a reconceptualization of language, and later ‘writing’, into a much more-than-human capacity. Quite suddenly, it became possible to conceive of the play of difference and sameness, of chance and necessity, of coding and indetermination, as generic operations – as common structural dynamics that drew the knowledgeable, communicative human subject into the infinitely more encompassing current of biological life (Johnson, 1993: Ch. 5; see also Monod, 1971). As it also implicated life in what has usually been taken to be our own unique and defining capabilities. Or as philosopher Georges Canguilhem expressed it: ‘Life has always done – without writing, long before writing even existed – what humans have sought to do with engraving, writing and printing, namely, to transmit messages’ (1994: 317).

This interdisciplinary encounter went far beyond socio-historical or epistemological reflection on science: it saw the sciences as bearers of truths with profound ontological significance. ‘Interpreted in a certain way’, Canguilhem went on to reflect, ‘contemporary biology is somehow a philosophy of life’ (1994: 319). It also went beyond the life sciences, to take in developments in information theory and cybernetics: fields which were witnessing a turn away from concerns with homeostasis and equilibrium toward an understanding of the way noise, interference and the emergence of novelty co-existed with tendencies for conservation (see Hayles, 1999: Ch. 6). Commenting on François Jacob’s presentation of the new biology, Michel Serres sought to grasp the broader import of this resonance of themes between otherwise disparate fields: ‘Like the other sciences’, he wrote of molecular biology, ‘it points towards a general philosophy of marked elements’ (cited in Johnson, 1993: 3).

This search for a philosophical understanding of the play of difference and repetition that goes well beyond human symbolic systems – or

any anthropologic register – links the work of Michel Serres, Gilbert Simondon, Georges Canguilhem and Gilles Deleuze (see Gualandi, 2009). Though it is more controversial, there is ample evidence that it is also pivotal to Derrida’s conception of writing ‘in the general sense’ (see Johnson, 1993). As Derrida puts it himself, albeit more cautiously than some of his compatriots: ‘I prefer always to speak of the iterability of the *mark* beyond all human speech acts. Barring any inconsistency, ineptness, or insufficiently rigorous formalization on my part, my statements on this subject should be valid beyond the marks and society called “human”’ (1988: 134, author’s italics; see also 1984: 2).

What the move towards a ‘general philosophy of marked elements’ demonstrated was that philosophical inquiry could unhinge itself from the human subject without losing its passion for action or transformation (see Rabinow, 1994: 21). At least for a moment, philosophy had cast off its anthropocentrism for a materialist critique which denounced any privileged place for reflection on *human* knowing or doing. As Alberto Gualandi vouches: ‘The French philosophers of the sixties attempted something ... audacious. According to them, man and his thought would be but finite forms among others, all engendered on the basis of an obscure and infinite ground that one might call Being or Nature’ (2009: 502).

While it is well known that these thinkers were fiercely resistant to the metaphysics of presence – the assumption that there once was a pure, stable and plenitudinous nature to which we ought to try and return – this is not the same thing as rejecting the function of the ground. As Alain Badiou would later put it, in conversation with the thought of Deleuze: ‘One should not be too quick to believe that one has finished with the ground’. Before going on to add that the rethinking of the ground, for all that it is ‘rendered complex by the conditions of our epoch’, remains a necessary and pressing task in the contemporary world (2000: 45, 55, 46). And as Gualandi’s comments remind us, we shouldn’t rush into thinking we are done with nature as the ground of human thought or action: which also means questioning the very idea of ‘denaturation’ as an inherently progressive or critical manoeuvre (Nancy, 2007: 87; see also Cheah, 1996).

What those rather remarkable ‘philosophies of marked elements’ were doing was wrenching away Husserl’s sense of a permanent or rigid ground, and replacing it with one that was unstable, mutable, transformative. As Derrida would later put it, there is no ultimately solid bedrock to connect with, only a further play of elements, and another, and another: ‘bottomless, endless connections and ... the

indefinitely articulated regress of the beginning' (1981: 333–4). This is still a ground – it remains a source, a subtending, a reservoir of possibilities for later developments. It just doesn't provide any anchoring, any certainty, any promise of unity. Quite the inverse, a ground that is characterized by an unending 'textural' interplay of elements functions as an impetus for further differentiation and change for all those beings or entities that rest upon it. It gives rise to the very play of difference and sameness that more conventional social or philosophical inquiry routinely attributes to language and other cultural systems.

To be sure, it was biology, to a far greater extent than the geosciences, which provided the initial push towards a more mobile and exuberant ground. In the writings of Michel Serres (1995, 2001), however, the noise and indeterminacy of the biological is complemented by a much more encompassing sense of elemental dynamism: one which takes in the rhythms and entwinings of earth and sea and air. But it's the work of Gilles Deleuze and Felix Guattari that has come to be most strongly associated with the idea that the earth itself is the primordial and exemplary form of the unstable ground.

As early as *Difference and Repetition* (1994 [1962]), Deleuze was grappling with the philosophical implications of the nascent study of nonlinear and chaotic systems. Here, he speaks specifically of physical systems 'bifurcating' – that is, passing through critical points into alternative states – and more abstractly of a generative chaos from which the earth and cosmos emerge (1994: 147, 199; see also De Landa, 1992; Bonta and Protevi, 2004: 6–7).

In their first collaborative work, *Anti Oedipus* (1983 [1977]), Deleuze and Guattari begin to think of the earth as a full, indivisible and generative entity: a pulsing body of productive forces. From the outset, theirs is a very different story from that favoured by social scientists engaging with ecological issues. Where social researchers repeatedly proceed from the observation that environmental problems overflow national boundaries, Deleuze and Guattari make their ontological priorities clear by insisting that first there is an earthly body composed of energetic and material flows, and only later does there arise a human impulse to deal with this inherent dynamism by inscribing marks on the surface of earth (1983: 139–44). In *What is Philosophy?* they develop this sense of the earth as the primary source of life-altering provocations into a fully fledged 'geophilosophy'. We inhabit a planet, Deleuze and Guattari argue, that is liable to spontaneously reorganize its elemental strata and flows into novel

configurations: 'an earth (which) constantly carries out a movement of deterritorialization on the spot' (1994: 85).

All material bodies, they propose, have this potential to disaggregate and recompose their constituent parts into a different state of being. But just as Husserl's earth gathered in and bound together all the other elements, so too for Deleuze and Guattari does the earth play an 'exemplary' role: 'The earth is not one element among others but rather brings together all the elements within a single embrace ...' (1994: 85; see also Turnbull, 2006: 135). In contrast to Husserl's 'immovable ark', however, their earth is far too volatile to ever function as an anchoring ground. Its integrative role is merely an interval before the earth shakes off its composure and reactivates its constitutive elements '... using one or another of them to deterritorialize territory' (1994: 85). Effectively, what Deleuze and Guattari's earth bundles together are all the terrestrial capacities for upheaval and metamorphosis. Their earth is a *metastratum* of inherently excessive forces and energies, in which even the most apparently stable or stratified formations will sooner or later unsettle themselves (1987: 40). Or, if we look at these strata through a long enough lens, we will find that they were morphing and flowing all along. For, as Deleuze had earlier noted, 'the hardest rocks become soft and fluid matter on the geological scale of millions of years' (1994: 2).

Whatever their other differences, Deleuze and Guattari share with Derrida a strategy of constantly seeking openings between a chosen focus of inquiry and whatever context or field lies beyond it – and beyond that and so on. In Derrida's case, for all his ostensible commitment to the 'indefinitely articulated regress of the beginning', promising gestures beyond the human rarely eventuate into sustained forays into extra-cultural zones (Protevi, 2001: 9). Though it must be added that more maverick interpreters have productively extended his characteristic tactics and manoeuvres deep into the recesses of the organic and the inorganic (see, for example, Kirby, 1997, 2001; Craw and Heads, 1988; Wilson, 1998), Deleuze and Guattari, famously, have no hesitation in leaping from one domain or strata to another. If the earth is the preeminent reservoir of the material–energetic resources in the immediate vicinity of the human species, our planet in turn opens out to a no-less excessive and perturbing cosmos. And in this way, any human or other terrestrial life form not only channels the forces packed into our home planet, but ultimately taps into the 'Whole of the universe' (Deleuze, 1990: 77). Thus, in the Deleuzoguattarian oeuvre, philosophical immanence implies anything but a globality with no exterior. It means that 'the

potentialities of any given actuality are the cosmos as a whole' (Williams, 1997: 236; see also Clark, 2005a).

There is another strand to post-war French philosophy that posits a turbulent and generative earth that is ex-orbitant in its openness to the cosmos. In a thesis that influenced Derrida, Baudrillard, Foucault and other key post-structural thinkers, George Bataille (1991 [1967], 1993 [1976]) argued that all our 'restricted' economies – economic systems in the conventional sense that only account for what can be calculated and exchanged – need to be reconsidered in the light of their interchange with the more exclusive or 'general' economies that are their context. Bataille insisted that the only way to understand the predicament of the human and all its achievements and challenges was to think in terms of 'an economy on the scale of the universe' (cited in Stoekl, 2007: xiv). By this he meant that we need to understand our economic, cultural and political existence not only in relation to the spatial limits imposed by our inhabitation of a finite, spherical planet, but also in regard to the excess of solar energy which the earth receives – and the pressure towards growth and expansion implied by this abundance (Bataille, 1986 [1957]: 94, 1991: 23).

Bataille took inspiration from Friedrich Nietzsche's depiction of the sun as a source of endless energetic gifts to the earth for which it demanded nothing in return: taking this primordial stellar act of pure generosity as indicative that abundance comes before scarcity, and that unilateral offerings or openings precede relationships built upon the expectation of a return (Bataille, 1991: 28). But it's noteworthy that this affirmation of radical asymmetry had another, very different inspiration. Though he has been taken to task for the way his celebration of excess and lack of self-restraint promotes the aestheticization of all modern values (see Habermas, 1983: 14), this line of critique misses the crucial significance of the conversation with physical science in Bataille's work. As signalled by references in his magnum opus, *The Accursed Share*, Bataille was an early and receptive reader of Vernadsky, whose theorems on the operation of the biosphere, as I noted above, anticipated many of the subsequent turns taken by earth science (see Bataille, 1991: 29).

Vernadsky's insistence that '(t)he biosphere is at least as much a *creation of the sun* as a result of terrestrial processes' (Vernadsky, 1998 [1926]: 44, author's italics) resonates in Bataille's argument that all the economies we construct for ourselves are open to the wider environment, to the earth itself, and must ultimately 'measure up to the universe' (1991: 11). It's intriguing to speculate that

Vernadsky's model of a solar-charged biosphere – surely one of the most prescient scientific ideas of the last century – has left its glowing residue, via the writings of Bataille, in the core of post-structural philosophy. Bataille's 'accounting' for the role of solar energy in human and other terrestrial life was at the crux of his argument – taken up as a staple of post-structural and postmodern thought – that the systems we compose for ourselves can neither be closed at their beginning nor at their end – and are thus destined to be perpetually energized and animated by their outside.

But Bataille went further than this, proposing that our reliance on a monstrously excessive energy – the fact that our social existence is fuelled from a source far beyond our control or containment – ensures that we are inescapably exposed to the most violent, perturbing forces of the cosmos. As Nick Land gleefully proclaims of Bataille's crucial insight: this 'energetic trajectory ... is the molten terrain of a dark communion, binding him to everything that has ever convulsed upon the Earth' (1992: 32).

Taking cues from Serres, or Deleuze/Guattari, or Bataille about conceiving of the ground as inherently shifting and precarious may help see off an earlier enthrallment with permanent moorings, but it need not spell the end of the phenomenological concern with the experiential dimensions of earthliness. Now that the 'objective' earth of the physical sciences is as much the shuddering terrain directly under foot as it is an 'abstract' astronomical body, the irreducible tension between Husserl's earth radically at rest and the intangible mobility of an orbiting sphere ought to have lost much of its bite. While the empirical or cognitive account of the planet's complex dynamics does not directly disclose the bodily, sensuous and affective dimensions of inhabiting an endemically unstable earth, it nonetheless points more toward a necessary (indeed urgent) complementarity than it does to a terminal incommensurability.

Indeed, one of the most important implications of evolving earth science discourses may be their imperative to bring the theme of the abyssally playful ground into closer proximity with that of the constitutive openness and receptivity of the phenomenal body.

Conclusion: down to earth

Meditating on the 'inconstancy of the world' shortly after the devastating Lisbon Earthquake of 1755, the young Immanuel Kant concluded: 'Man was not born to build everlasting cottages upon this

stage of vanity' (1994 [1756]: 29). It was not until over two centuries later that the earth sciences could offer a certain and coherent explanation for the world's more momentous 'inconstancies'. Revealing the entire surface of the earth to be in grinding, juddering motion, the geoscience story suggests that what are catastrophes for soft, fleshy creatures like us are for the earth merely minor and mundane readjustments.

The convulsions of nature that so perturbed Kant and fellow Enlightenment thinkers subsequently drifted far out of philosophical focus. So far, in fact, that whole schools would embrace the solidity of the earth beneath our feet – and assume that this abiding base offered 'thought' (a synecdoche for all human endeavour) its best or only foundation. While such a sense of earthly certitude has been frequently and thoroughly problematized, it has been troubled most often on account of the way that certain kinds of human experience – especially those associated with techno-cultural change – mediate between 'us' and the earth we stand upon. Even in the midst of the revolutionary discoveries of latter twentieth-century earth science, there has only infrequently been any real consideration about what the planet's own complex dynamics might mean for rethinking the 'ground'.

In a creative outburst of French theory in the 1960s, an opportunity opened up for drawing the emergent understanding of the dynamism of the earth into the core of Western thought. Inspired especially by the new understanding of the indeterminate coding that animated biological life, a cohort of thinkers began to explore the idea that nature itself was an unstable, unlimited and incessantly generative ground for human becoming. And yet, while a feeling for the 'vitality' of the organic has intermittently resounded through subsequent philosophical and social inquiry, a full acknowledgement of the differential force of elemental processes more generally has yet to really take hold.

Deleuze and Guattari's geophilosophy, Serres' rhythmically pulsing planet, and Bataille's energetic geophysics have each in their own way gestured towards an expansive sense of the earth and cosmos as the volatile ground of human and other creaturely life. Only recently, however, have these openings begun to be taken up in a sustained and serious way, and arguably we still await a full encounter between the best that philosophy has to offer on the topic of the ungrounding ground and the many provocations of earth science (see Frodeman, 2000: viii–ix). While there have been several decades of productive articulations with the life sciences, especially in feminist theorizing

of the body, explicit engagements with a nonliving materiality remain rare. As a few philosophers have lately noted, in most of the encounters with elemental matter to date, it has paradoxically been the ‘liveliness’ of the inorganic that has been highlighted, at the expense of properties that are more specific to the mineral or chemical structures that make up most of the known universe.

Resuscitating what he sees as exceptional more-than-organic themes in the work of the eighteenth-to-nineteenth-century nature philosopher Friedrich Schelling, Iain Hamilton Grant contends that modern philosophical thought has rarely proceeded further than animality (2006: 9, 18). In not daring to leave the ‘ontological cul-de-sac of organism’, he argues, it has failed to give adequate attention to the unstable ground – the ‘brute matter’ from which life emerges (2006: 81; see also 2010). Or as Graham Harman, in conversation with Grant, has put it: ‘Life-philosophy is an alibi for refusing to deal with the inorganic ... it’s a way to stay close to the human while claiming that you’re going deeper than that somehow’ (Harman, 2007: 382).

This recalls an earlier point made by Jean-François Lyotard in reference to use of the concept of ‘Life’ to cover generic processes of ‘desire’ or ‘complexification’: his contention that ‘resort to this term seems still far too derivative of human experience, too anthropomorphic’ (1991: 45). But both Grant and Harman seem to be going further than this, for they are also wishing to disabuse philosophy of any expectation that ‘merely crude matter’ *should* complexify, *should* give rise to life, *should* have any such ‘higher’ effects in order to qualify for our consideration (Grant, 2007: 360; Harman, 2007: 382). If we demand of matter that it acts as though it has vitality, then we overlook or downgrade the possibility of it simply persisting in a rock-like or mineral condition. And that means that we foreclose on the challenge of thinking through or about a domain of existence that is devoid of any trace of thought, or feeling, will, or any other quality we habitually recognize in ourselves. To take a lead from Harman, ‘rather than anthropomorphizing the inanimate realm’, we need to start ‘morphing the human realm into a variant of the inanimate’ (2009: 212).

Such speculations are rife with potential for a new kind of engagement with earth science, a conversation that could pick where the old ‘philosophies of marked elements’ left off – only this time moving well beyond the enthrallment with the continuity between biology and human expressive capacities. If philosophy, as the introduction to a recent collection put it, is ‘to come back “down to Earth”, it is an

Earth which we no longer fully recognise, and which continues to offer numerous challenges – by turns urgent, melancholy, and twisted – to the thought it has given birth to’ (Mackay, 2010: 19).

As the philosophical return to earth gathers momentum, it remains to be seen whether social thought will be joining the adventure. Looking beyond the current fixation on the connective capacities and motilities of our own species, human geographer Doreen Massey confronts the ancient manoeuvring of life and rock. And concludes that this is ‘a planet that has ever been a global mobility’ (2005b: 98, 138; see also 2006). But in the realms of critical social and cultural thought, this is a still a rare admission (but see Hinchliffe, 2003). Even after a good decade and a half of concerted reaction to the so-called ‘cultural turn’, even after years of promoting an active and agential ‘materiality’, the best that most of us can offer is a concession that not all of the realities we inhabit are made by humans alone. Granted, attention to the way that humans and nonhumans mutually confederate each other continues to make a crucial contribution to the understanding of a certain category of socio-technical problem, of which more in the next chapter. But these are not the only threats or hazards or inducements that weigh upon human life.

Like many of his compatriots in the social sciences, Ulrich Beck continues to insist that ‘Nature ... has ceased to exist’, that ‘nature “in itself” cannot form an analytic point of reference’ (2009: 83). And yet, just a few pages earlier he expounds:

the year 2005 reminded us once again, with the tsunami catastrophe, the destruction of New Orleans by Hurricane Katrina, and the devastation of extensive regions of South America and Pakistan, of how limited the claim to control of modern societies remains in the face of natural forces. (2009: 50)

But why exactly is it, we must wonder, that even after half a century of insistent tutoring by the earth sciences, our ‘modern societies’ still need to be reminded of their exposure to ‘natural forces’? Could it be that critical social thought’s own tenacious disavowal of any grounding function of nature is itself as much a part of the problem as it is a solution? Can any approach that rebukes the exteriority or independence of nature, any theorem that restricts globality to an effect of human orchestration really get to grips with the full potentiality of the earth and cosmos – or the extent of human vulnerability to this eventfulness?

In the following chapter, I zoom in on those modes of engaging with natural or material agency that currently predominate in critical social scientific thought and practice. Keeping firmly in mind that 'life' is only one variant of the forcefulness or agency of the world, I set out from the particular concern with life's exuberance and mobility that is currently galvanizing social theorists working the society–nature juncture. I consider both the strengths and limitations of recent approaches to understanding the processes by which the worlds we live in get made, and weigh up the alternatives that are now on offer. And in this way, I come back to the renewed philosophical interest in an earth which does its own thing, whatever surcharge we add to its mobilizations – or to its obduracy.