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Geography and abstraction: Towards an affirmative critique

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Abstract
A critique of abstraction has become one of the most important reference points for contemporary human geography. The terms of this critique have, however, been limited by the tendency to oppose the abstract to the lived. This paper argues that abstraction can be affirmed as a necessary element of understandings of lived worlds in the making. Doing this requires revisiting the relation between abstraction and two matters of disciplinary concern: experience and materiality. These matters of concern are drawn together via one technology of abstraction, the diagram, before an affirmative critique of abstraction for geographical thinking is outlined in concluding.

Keywords
abstraction, critique, diagram, experience, line, materiality

I Introduction

This paper revisits the critique of abstraction that has come to inform much of human geography research over the past 40 years or so in order to argue that the terms of this critique are in need of some revision. On the face of it, the question of abstraction and its relation with geographical thinking and research would appear to have been largely settled: certainly, few papers or commentators deal explicitly with the question of abstraction. This is because a particular understanding of abstraction has become an implicit reference point for geographical thinking: that is, abstraction has tended to be cast as a malign process of generalization and simplification through which the complexity of the world is reduced at the expense of the experience of those who live in the concrete reality of this world. Equally, the charge of abstraction has become a way of depicting certain styles of thinking as being aligned with and reproducing disembodied habits of knowing, techniques of alienation, and failing to recognize corporeal difference.

This critique of abstraction has provided geographers with critical purchase upon a range of important processes and phenomena. It can be traced, for instance, through the familiar reproach to spatial science and the quantitative revolution for reducing human life and experience to a series of mathematical or diagrammatic models (Buttimer, 1976; Entrikin, 1976); the thoroughgoing critical analysis of capitalism as a process facilitated by, and reproducing itself, through structures and systems of spatiotemporal abstraction (Harvey, 1985; Lefebvre, 1991); the critique of the state as an assemblage of technologies for writing, calculating, and governing geopolitical

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and biopolitical spaces at a range of scales and theatres of conflict (Brenner and Elden, 2009; Gregory, 2010; Sparke, 2005); the damning indictment by feminist scholars, including geographers, of the role of abstraction in sustaining and legitimating an epistemological architecture in which the visual logic of the rational mind is elevated above the situated messiness of carnality and embodiment (Deutsche, 1991; Haraway, 1991; Rose, 1993); and the critique of cartography as a set of techniques and technologies of abstraction that effaces and elides as much as it reveals and represents (see, for instance, Gregory, 1994; Pickles, 2004; Roth, 2009).

Underpinning this critique is, however, an assumption in need of some revision. This is the assumption that there is a necessary opposition between the lived and the abstract. Put simply, abstraction is too quickly understood to be a technique of reductive simplification that fails to grasp the messy complexity of the space of the lived, particularly insofar as it ignores and erases corporeal difference. Moreover, and relatedly, abstraction is too easily taken to be an act of transcendence that removes thinking from the material relations of which lived worlds are composed. While acknowledging the value of much of the work outlined above, here I want to argue that this critique of abstraction, and the terms on which it is based, have become too settled, with the effect that they have made it more difficult to affirm the value of a differentiated sense of abstraction for geographical thinking and research in a world where what counts as lived space is arguably becoming increasingly complex. My claim is that without remaining 'vigilant in critically revising' our own relation with abstraction and the terms upon which these relations are based (Whitehead, 1967: 59), it may well be the case that geographers run the risk of missing opportunities for attending to the surprising ways in which abstraction can participate in how we think through and become involved in lived space-times. That is, a taken-for-granted sense of abstraction can never be a secure platform for critique, but must itself be continuously subject to an affirmative style of critique in which the question of how abstraction works and comes to make a difference remains an open one.

In some respects, this revision is taking place across a range of disciplines, as a small but growing clamour of voices returns to the question of abstraction in important if sometimes challenging ways (see, for example, Bamyeh, 2010; Goffey, 2008; Mullarkey, 2006; Osborne, 2004; Osborne and Rose, 2004; Rajchman, 1998; Stengers, 2000, 2008; Toscano, 2008a, 2008b; Virno, 2001). As Alberto Toscano (2008a: 58) has observed, in such work the status of abstraction seems to be transforming, with a focus on the critique of lifeless, rigid, and 'cold abstractions of yesteryear' being supplemented by the critical affirmation of lively, dynamic, or 'warm abstractions'. That is not to say simply that in such work a newer, friendlier version of abstraction is naively celebrated as an end in and of itself: rather, the aim of much of this writing is to affirm the importance of being open to the multiple ways in which abstraction participates both in the worlds we inhabit and in our efforts to make sense of them. In addition, such work reminds us of the fact that abstraction is differentiated. Within geography, however, there has arguably been less explicit reflection on the necessity and value of affirming abstraction. An important exception is work influenced by Marx (see Harvey, 1995; Horvath and Gibson, 1984). Thus, writing more than a decade ago, Noel Castree (1999: 141) made the case for '*more*, not less, theorizing about capitalism and a specifically *abstract* form of theorizing to boot'. It is possible, of course, to understand such claims as precisely the kind about which feminist geographers and others have been so critical, in part because they seem to affirm a form of thinking distanced from the texture of lived experience (Rose, 1993). More recently, however, the value of abstraction has also been affirmed by non-representational

styles of work (Lorimer, 2008; McCormack, 2002; Thrift and Dewsbury, 2000; Thrift, 2008). While this work is often understood to emphasize the immediacy of lived experience, what is often forgotten is that it is also concerned with the technologies and practices through which experience as such shows up (Thrift, 2008). In doing so, it prompts us to question the distinction between lived experience and abstraction where the latter appears to be such a constitutive participant in the qualities of the former.

In this paper I draw upon this work in order to make a substantive contribution to a necessary revision of the way in which geographers understand and engage critically with the question of abstraction. My aim in doing so is not to replace a set of 'bad' abstractions with a set of 'good' abstractions. Nor, indeed, do I want to claim that we need to suspend the critique of abstraction in favour of a naive affirmation. Rather, what I wish to do is to draw out the *affirmative* dimensions of geography's critique of abstraction in a more explicit way than has tended to be the case previously; and I wish to argue that central to this revised critique is a commitment not to allow some of the acknowledged problems with abstraction to foreclose possibilities for thinking *with* abstractions as part of the practice of understanding and participating in the lived processuality of the world. That is, my claim is that abstraction is a necessary way of making more, not less, of the experiential and material complexity of lived space-times.

The paper is organized as follows. To begin, in section II, I rehearse some of the key charges levelled against abstraction by returning briefly to some of the writing of Henri Lefebvre. Lefebvre is valuable here because he foregrounds the tensions inherent in thinking with and against abstraction, particularly the tension between the lived and the abstract. Departing from Lefebvre, the paper then revisits the relation between abstraction and two matters of concern – experience and materiality. I then draw some of these concerns together by considering briefly a familiar geographical technology of abstraction, the diagram. The paper concludes by outlining a number of ways in which an affirmative critique of abstraction matters to geographers, and how it might be developed further.

II Abstraction's critique

Before proceeding, it is worth elaborating a little upon the kind of abstraction that has been subject to critique within the discipline. Perhaps most generally, abstraction tends to be understood as a process of selective reduction through which the complexity of world is simplified. It is taken to involve isolating or identifying the most essential processes driving or shaping phenomenon, temporarily bracketing these from extraneous influences and background empirical noise. As such, it provides a way of synthesizing the results of individual observation and description. In that sense, concerns with abstraction can be traced, for instance, through efforts to distinguish between ideographic and nomothetic approaches (Hartshorne, 1939). It is also often – but not always – premised on the possibility of generalization: that is, the capacity to identify regularities and relationships across classes of events and phenomena. Of course, it is also important to distinguish between abstraction as a process and abstraction as a noun. Abstraction is the process by which simplification takes place, and abstractions are taken to be those representational forms through which this process is stabilized and through which its results circulate.

We might enumerate the terms of the critique of abstraction understood thus – admittedly in broad-brush terms – as follows. First, abstraction can be problematized as a process of intellectual *withdrawal* from the world. In a messy, complex world, abstraction allows thinking to retreat to the relative safety of the mind, which then becomes – at least in theory – a secure

platform for the rational examination of a world now rendered external. Equally, abstraction marks that capacity of thinking and power to separate itself from bodily and affective influences that might undermine its clarity and cogency: it is therefore underpinned by a logic of *distancing* in which a necessary condition of understanding the world is the act of separation of subject and object. Clearly, this logic is the target not only of a critique of certain forms of disciplinary thinking. It can and has also been used to understand how spaces are ordered and governed though a range of political-economic and geopolitical techniques (Gregory, 2010). A further charge is *reduction*. Here abstraction is assumed to reduce the rich heterogeneity of the lived, embodied experience of the world to the status of a self-contained and clearly delimited category for the purposes of simplification and generalization. Relatedly, abstraction is charged with a certain *universalism*. By positing a particular category or class of experience, for instance, abstraction implicitly renders corporeal difference secondary. In the process, as feminist scholars have argued, the universalism of abstraction is often also based upon the assumption of a particular subject position, nominally neutral, but implicitly white, male, and western (Haraway, 1991; Longhurst, 1997). Finally, abstraction is problematized on the basis that it is *alienating*. Here, as Marx and various interpreters remind us, abstraction is taken to divorce the individual from the product of their own labour. By way of example, techniques and technologies for organizing the movements and efforts of the body can be understood to abstract the individual from the product of their own energetic embodiment (Cresswell, 2006).

This is only a very brief overview of some of the key charges levelled against abstraction as both process and thing. By way of giving focus to my discussion, I wish to turn briefly to the work of Henri Lefebvre. Lefebvre is especially appropriate here because his work has become an influential touchstone for engagements with questions of abstraction within geographical thinking and beyond (see Brenner and Elden, 2009; Elden, 2004; Gregory, 1994). At the same time, Lefebvre has a particularly well-developed understanding of the relation between spatiality and abstraction under capitalism: indeed for Lefebvre the space of capitalism can be understood as a concrete abstraction – something borne of a withdrawal from the world which nevertheless becomes a constitutive element of that world (see Stanek, 2008). Present elsewhere in his work, Lefebvre's critique of abstraction reverberates with particular intensity in *The Production of Space* (1991), where he outlines the charges against *abstract space*.[1] The elements of abstract space are fundamentally *duplicitous*, concealing the real forces shaping the inequities and injustices of everyday life behind the appearance of homogeneity. That is not to say that all abstract space is 'homogeneous' but that 'it simply has homogeneity as its goal, its orientation, its 'lens'' (Lefebvre, 1991: 287). Equally damning is Lefebvre's claim that abstraction is both intrinsically *violent* and 'repressive in essence' (p. 318). And what it represses is *differential* space – a space generative of difference and creativity (p. 395). The reductivist and homogenizing tendencies of abstraction erase this difference: the latter becomes something already calculable or definable in relation to a prefabricated set of possibilities (p. 396).

The repressive, homogenizing and duplicitous violence of abstraction as a 'brutal spatial practice' (p. 308) can be traced through the reshaping of urban environments according to the grand plans of figures including Haussmann or le Corbusier, and their replication in a plethora of planned communities and urban projects (see Boyle, 2005; Charnock and Ribera-Fumaz, 2011). It is also evident in the governance of society, and particularly urban life, through the logic of sociotechnical systems and models that render complexity a calculable and manageable object: such systems reduce the

human individual to the status of the 'abstract subject' (Lefebvre, 1991: 312).[2] Lefebvre obviously also reminds us how abstraction is implicated in the reproduction of capitalist systems of value and life. Capitalist abstractions include the commodity, surplus value, labour, and, of course, space and time, each of which is inherently alienating, insofar as they tend to 'turn [man] into a thing himself, just another commodity, an object to be bought and sold' (Lefebvre, 1972: 9). Crucially, the abstractions of which capitalism consists do not hover, wraith-like, above the world, but circulate in a space of exchange, accumulation, growth, calculation, planning, and programming that has a 'social existence' (Lefebvre, 1991: 307). These abstractions are therefore concrete in the sense that they come to have a constitutive force in the world. It is in relation to the body that Lefebvre's critique of abstraction has particular force, however. For Lefebvre, abstraction has framed the relation between space and the body such that the latter has been transported 'outside itself in a paradoxical state of alienation' (p. 308). Lefebvre's critique is a damning one: abstraction is thoroughly implicated in the symbolic and material betrayal, denial and abandonment of the body in western thought and society, erasing distinctions which 'originate in the body (age, sex, ethnicity)' (p. 49). For Lefebvre, this erasure is exemplified by particular strands of western art, especially cubism: here the body becomes a series of planes, surfaces, and lines rendered according to the logic of the geometrical, visual, and phallocentric formants of abstract space. Such art, according to Lefebvre, is symptomatic of a more general fragmentation and 'pulverizing' of the corporeal into distinct zones and specialized locations, situating it within a grid of positionality and legibility.

Obviously Lefebvre can therefore be used to support a strong critique of abstraction as a both a feature of the world and an element of geographical thinking. This is certainly how his work was mobilized by Derek Gregory (1994) in the context of a critical reading of David Harvey's (1990) writing, on the basis that the latter engaged in a mode of abstraction inattentive to the kinds of corporeal difference with which Lefebvre is so concerned.[3] Equally, and more recently, for those interested in affirming the importance of the emotional qualities of lived experience, Lefebvre's critique of abstraction is an appealing one (Smith et al., 2009). Indeed, the corollary of Lefebvre's argument would seem to be the affirmation of a kind of phenomenology of the body and its generative participation in 'lived space'. For Lefebvre, the 'practical and fleshy body' is always generatively implicated within spatiotemporality (Lefebvre, 1991: 61). The resonance between this claim and phenomenological accounts of embodiment and lived space are obvious (see Simonsen, 2005).[4] Yet Lefebvre's appeal to the lived is always achieved via a kind of technique of abstraction, and in ways that complicate any appeal to the preconceptual as the grounds of phenomenological experience. As he puts it, 'we are proceeding via abstraction, to delve into the hidden life of visible and tangible human beings ... such an abstraction is legitimate and well founded, because it reaches something which psychological or sociological evidence does not reveal' (Lefebvre, 2008: 55–56).

Lefebvre's thinking therefore crystallizes a critical tension that inheres in the problem of abstraction: his writing can be deployed simultaneously in support of a critique of abstract space in western thinking *and* used as evidence for the necessity of abstraction for any effort to think through the processual materiality of lived space (see also Roberts, 2001). How could it be otherwise? As Lefebvre (1991: 288) himself puts it, abstract space is at 'once lived and represented, at once the expression and foundation of a practice, at once stimulating and constraining'. Furthermore, he is also careful to highlight those forces and agencies excessive of abstraction. Clearly, then, Lefebvre encourages us to be critical of abstraction. However, contained

within his work – and this often seems to be forgotten – is the possibility for developing an affirmative critique of abstraction: that is, a critique attentive to the problems with abstraction, but also open to the diverse ways in which abstraction participates in the generative act of thinking.

III Abstract experience

We can think through the possibilities emerging from this brief encounter with Lefebvre's work by considering the relation between abstraction and two key matters of concern. The first is experience. As Lefebvre's work suggests, abstraction can be understood as a technique of thinking which marks a removal from the contingent nature of empirical experience in order to generate some kind of extra-experiential generalization that then floats freely without need to be tested (see also Dewey, 1958). Hence the inadequacy of abstraction for thinking lived experience. As he puts it, 'knowledge falls into a trap when it makes representations of space the basis for the study of 'life', for in doing so it reduces lived experience' (Lefebvre, 1991: 230).

However, this does not mean that experience and abstraction are necessarily opposed, and not least because the worlds we inhabit are unthinkable, unnavigable, and unliveable without abstractions in their manifold guises. As forms of organizational consistency and technologies for ordering worlds, processes of abstraction have multiplied and proliferated to the extent that in many ways they provide the necessary generative precondition for what shows up or registers as lived experience. That is not to say that the relation between abstraction and experience is a new one. Arguably, as Osborne and Rose (1999) argue, some kind of abstraction is necessary for any spatial-temporal experience to register as such. However, the forms that abstraction takes have certainly become more complex. To name but a few: in the form of economic projections abstraction draws us into or away from possible futures and decisions (Leyshon et al., 2005; Zaloom, 2009); in the shape of technological control systems it both discreetly organizes and sets limits on the kinds of experience we expect as part of the process of travel and journeying (Dodge and Kitchin, 2005; Thrift, 2004); in the form of information it becomes part of distributed environments that actively monitor, anticipate, and generate distinctive forms of behaviour and conduct (Crang and Graham, 2007). In this sense, for instance, software and code (Budd and Adey, 2009; Dodge and Kitchin, 2009; Dourish and Bell, 2007; Thrift and French, 2002) can be understood in terms of a technical abstraction that makes certain kinds of experiences possible within the transductive infrastructures of everyday life. Equally, in the guise of graphics and diagrams abstraction draws our attention to what appears to be salient about particular public issues and controversies (Stark and Paravel, 2008).

Clearly, some of these processes might well be alienating, and might reproduce certain problematic social, economic, and spatial formations, not least through the production of abstract biographies of individual life-worlds (Dodge and Kitchin, 2007), but they also have the possibility of disclosing new geographies of connection and movement that do not necessarily sit easily within any juxtaposition of the lived and the abstract. Similarly, transformations in cartographic technologies are producing new opportunities for informal knowledges and experiences of spaces, perhaps most obviously in cities (Crampton, 2009; Crang and Graham, 2007; Galloway, 2004). In short, abstraction is crucial to the ongoing transformation of what Nigel Thrift (2004) calls the 'technological unconscious': that is, abstraction is a constituent element of the background infrastructures that allow life to show up and register as experience. Seen in this way, abstraction is an irreducible part of the ontogenetic character of the worlds

we inhabit, 'a positive 'site' of the production of experience, constitutive of new 'concrete forms of spatial relationality generative of social meaning' (Cunningham, 2005: 23).

This claim should prompt us to question further an account of the space-times of experience premised primarily upon the idea of actuality or immediacy. More precisely, we might question those critiques of abstraction that take it to task on the basis that it is a withdrawal from experience: this is precisely because something of lived experience is always partially withdrawn from us. Experience needs to be understood in relation to that which is always withdrawn from it – otherwise it would be so self-contained that change or becoming would not be possible. We can illustrate this in two ways. The first is through ideas of spectrality. As Derrida (1994) reminds us, the spectral is first and foremost an unsettling of experience as a self-contained locus of sensation and perception. It is also, however, a challenge to the idea that the body is a site which resists abstraction because it is lived. If anything, it is precisely because something about the body and experience is always withdrawn from us that the body is resistant to incorporation within the category of lived experience. Put another way, it is impossible to avoid the withdrawal of experience, where withdrawal is not necessarily escape, but the agitation of presence (see Wylie, 2009). At best, then, we can only ever turn to a 'body that is more abstract than ever. The spectrogenetic process corresponds therefore to a paradoxical *incorporation*' (Derrida, 1994: 126) that is never premised on the possibility of the lived as a self-evident self-presence. To foreground the spectral as the ongoing unsettlement of presence and absence is therefore to recognize abstraction as a necessary complication of any appeal to a phenomenology of embodied experience.

The concept of the virtual serves similarly to unsettle the relation between the lived and the abstract: this is the virtual as the real but abstract condition of potentiality for change, a definition that emerges via the work of thinkers including Bergson and Deleuze. As Brian Massumi (2002) has suggested, this sense of the virtual as potential also has important implications for how we might think of the body. Specifically, it means that the body is never just actual but is always already populated by real but abstract virtualities composed simultaneously of pastness and futurity. Because of this, the issue for Massumi is not that our ways of thinking through moving bodies are too abstract, but that they are not abstract enough to grasp the real abstractness of potential for change and variation (see also Gil, 2006). Mobilizing concepts such as the spectral and the virtual may well make accounts of experience more abstract in the sense that they draw upon theoretical concepts to foreground the non-representational dimensions of experience, and may well be taken to task for this (cf. Bondi, 2005). But they do not make these accounts abstract in the sense that they are distanced from experience. Instead, they provide ways of foregrounding those aspects of experience that are not given in the immediacy of actuality. Put another way, they provide conceptual tools for thinking through the necessary *excess* of experience: that which overfills any sense of immediacy.

IV Abstract materials

A second way in which the relation between abstraction and the lived can be revised is through revisiting the question of materiality. A long-standing debate within geography has of course centred on the relation between the *concrete* and the abstract. In part through the influence of figures such as Lefebvre, but also importantly David Harvey, the influence of Marx looms large here, especially to the extent that it encouraged geographers to think about different levels of abstraction as theorization, and crystallized debates about the relation between the abstract and the concrete (see, for example, Cox and Mair, 1989; Harvey, 1996;

Horvath and Gibson, 1984). As Alberto Toscano (2008a) argues, this tradition remains important insofar as it is attuned to the question of how abstraction is implicated in the very constitution of the social, not perhaps as a set of structures, but as a set of associations with a degree of material consistency and coherence that participate in what counts as life and value. At the same time, as Toscano continues, the point of foregrounding the abstractions that frame space and time, particularly under capitalism, is not to replace them via an appeal to the immediacy of the concrete – there are no authentic essences beneath or behind abstraction, whose operation it is the task of critical theory to reveal (Toscano, 2008a). The task instead is to both reveal how abstraction works and to generate alternative abstractions as part of a necessarily critical praxis. Indeed, as David Cunningham has suggested, perhaps the real issue raised by the work of a figure like Lefebvre is not only the necessity of exposing the problems with abstraction outlined above. Instead, the question it poses is perhaps whether or not a 'certain abstract space [is] itself the condition, or indeed necessary form, of . . . differential space? Indeed, without certain structures and experiences of abstraction would any such space of a differential connectivity or social "unity" be conceivable at all?' (Cunningham, 2005: 23).[5]

This tradition of thinking through the relation between abstraction and the material can be supplemented with others, however. Equally important is work emerging from the confluence of science and technology studies (STS) and actor-network theory (ANT), in which particular attention is paid to the constitutive work that abstraction does in generating material worlds. On one level, this work reveals how abstraction holds material things together spatially and temporally. For instance, in *Aircraft Stories*, John Law (2002) reveals how abstraction – in the guise of plans, diagrams, schema, etc – works to provide a degree of 'fractional coherence' to the distributed object of aircraft design. Here abstraction is successful to the extent that it holds together, albeit somewhat unsuccessfully, a set of aesthetic, technical, and political orientations towards often divergent futures. At the same time, work in this tradition also reveals how abstraction works as processual transformations of materiality. Famously, in *Pandora's Hope* (1999), Bruno Latour writes about how abstraction participates in the phenomenon of *circulating reference*. Here abstraction is understood less as a vehicle for withdrawing from the world, but as 'an alignment operator, truthful only on condition that it allows for *passage* between what precedes and what follows it' (Latour, 1999: 67). Abstraction in this sense is a process of ontological transformation within, rather than an act of removal from, the world. Insofar as the soil samples pursued by Latour are incorporated into scholarly knowledge, they become more abstract *and* more concrete than what passed before: 'more abstract, since here an infinitesimal fraction of the original situation is preserved; more concrete, since we can grasp in our hands, and see with our eyes, the essence of the forest-savannah transition, summarised in a few lines' (Latour, 1999: 66).

Abstraction is also important insofar as it makes complex materials available for manipulation and management. That is, it is a necessary element of the production of what Andrew Barry (2001, 2005) calls 'informed materials', from pharmaceuticals to atmospheric pollution. Important here is the way in which the abstraction articulates the relation between complex materials and institutions designed to regulate these materials. As Bumpus (2011) demonstrates:

> without the ability to be spatially abstracted, carbon reduced through offset projects in the global south can never be fungible with the carbon emissions they are supposed to balance in the North: offsets rely on spatial abstraction because the carbon dioxide reduced in one place must be 'seen' to be the same as carbon dioxide that is emitted in another. (Bumpus, 2011: 622)

The capacity to produce such abstractions is critical to the production of credible 'socionatural-technical complexes' (Bumpus, 2011: 628).

Equally, abstraction has an important place in ongoing efforts by geographers to reconceptualize matter and materiality in processual terms. The tendency to distinguish between the abstract (as immaterial) and the concrete (as material) serves as an important point of orientation here, insofar as it has provided an anchor for the perceived theoretical excesses of culturally inflected human geography (see, for instance, Jackson, 2000; Philo, 2000). Yet an encounter with materiality does not lead inevitably away from abstraction. Indeed, a key element of thinking through materiality is a necessary concern with the role that abstraction might play in disclosing differentiated materialisms: hence the effort to develop conceptual vocabularies with which to think through the multiple ways in which materialities take place (see Anderson and Wylie, 2009; Latham and McCormack, 2004). Conceptual abstraction is absolutely necessary for this task: that is not to say that it provides frameworks through which to reveal the essence of materialities. Following Deleuze and Guattari (1988), the role of concepts as abstractions in this work is to connect with, and draw together, as much of the world as possible without reducing it. Exemplary here, for instance, is the concept of 'abstract machine': this is a concept that provides a way of plugging into materialities across diverse forms of life, allowing them to be conceived in terms of non-reducible consistencies and gatherings rather than in terms of concreteness.

V Drawing lines together: diagramming abstractions

In this penultimate section I want to bring together both matters of concern above through a brief consideration of one of geography's more familiar operators – the diagram. Clearly, the diagram has traditionally been a key abstraction within human geography, and for very good reasons – it allows for the reduction, schematization, and circulation of phenomena whether in the context of spatial science or the elaboration of theoretical critique (for an example, see Gregory, 1994). Equally, the abstract qualities of the diagram have imbued it with a sense of detached authority. Its capacity in this regard also renders it suspect as part of a modernist formalism in which 'the empty spaces of the geometrical diagram remain empowered by the legacy of Reason's obsession with simplification, elegance and order' (Philo, 1994: 236). Lefebvre (1991), for one, is critical of diagrams drawn on paper precisely because they exemplify how abstraction works to distance figures such as planners and architects from the complexity of lived experience.

Not surprisingly, then, the diagram occupies an uneasy position within geography – so much so that some geographers have been careful to avoid labelling work as diagrammatic that might otherwise be considered so. For instance, in a discussion of different possibilities for mapping emotion, Sarah MacKian (2004) presents a series of ways of visualizing affectivity. These maps of emotion are remarkably diagrammatic, and yet MacKian makes it explicit that they are not diagrams. As she puts it:

> one might argue that these visual representations of the world could be called 'diagrams', rather than 'maps'. However, I am not interested in listing, summarizing, and categorizing, which is what diagrams do well … Diagrams have connotations of sterile, mechanical descriptions of processes and flows. (MacKian, 2004: 628)

The point here is not to reclaim MacKian's maps as diagrams. More important is how such comments reveal the diagram's association with a mode of abstraction considered unable to capture a sense of the dynamism and 'complexity of experiential space' (p. 628). This critique of the diagram as a kind of static immobilization can

also be traced through writing on techniques and technologies that focus upon the movement and mobility of bodies. The argument here is that diagrams reduce the lived to a series of lines and points, rendering bodies susceptible to control and organization (see Cresswell, 2006).

However, there are a number of reasons for engaging in an affirmative critique of diagrammatic abstraction. First, and most obviously, the diagram reminds us that abstraction is pragmatic and practised. While it is easy to see abstractions as fixed, abstraction as a process is provisional and prospective, intended to open up potential space-times rather than close them down – a quality most obvious in architectural diagrams. The diagram can be seen as a kind of 'unformed drawing' that can work as a research tool to explore 'spatial concepts and relationships. The unformed drawing is an inventive rather than a representational device' (Manolopoulou, 2005: 520). Second, revisiting the diagram provides a way of revising the terms by which certain geographic renderings of everyday life have been understood and problematized. Consider, for instance, the diagrammatic abstractions of time-geography which, it is fair to say, have been subject to their share of criticism. In Torsten Hägerstrand's work (1970), the diagram becomes a technique for drawing out – abstracting – the time-space paths of everyday life. As a contribution to a renewed interest in what Parkes and Thrift (1980) called a 'chronogeographic perspective', these diagrams provided a technique for describing and notating the dynamic constitution of space-time in everyday life. Yet it was precisely this tendency towards abstraction that some observers found so problematic (see, for example, Gregory, 1978). The consequences of these tendencies were especially acute for feminist scholars: the abstractions of time-geography underpinned what Gillian Rose (1993) argued was the erasure of lived, bodily, and emotional difference through a conception of space and agency in the image of the white master-subject. There is certainly something of substance to these critiques. However, the rendering of the time-geographic diagram as essentially static can and is being revised in important ways that point to its value as a methodological device for disclosing the rhythms and routines of everyday life and experience (see Latham, 2003; Schwanen, 2007). Moreover, as Nigel Thrift has observed, these diagrams were, in part, a very situated 'attempt to describe the pragmatics of events', and in a way that also foregrounded the complexity of the nonhuman in everyday life (Thrift, 2005: 337). Indeed, these diagrams were anything but static: 'time geographic diagrams draw you in through a quietist creativity, trapping you in their nets. What they represent is a dynamic world in a world' (p. 338).

Third, revisiting the diagram provides a way of linking geographical thinking through wider philosophical concerns with abstraction (for a review, see Mullarkey, 2006). Important here is the work of Gunnar Olsson, not least because Olsson has been a consistent champion of the importance of abstraction for thinking geographically: indeed, for Olsson (1991, 2007) any cartography of thought always faces the challenge of being abstract *enough*. Equally, Olsson draws diagrams. As ways of doing geography, the lines drawn by Olsson's diagrams are transformative renderings of co-relation, markings of the passionate intensity of cartographies of lived abstraction that aim towards a drawing that can never be fully realized (see Doel, 2003). Olsson's work resonates with the work of other thinkers, perhaps most obviously Deleuze and Guattari, for whom the diagram is aligned with a certain cartographic activity involving the dynamic mapping of affects and percepts as part of a technique of existence (Massumi, 2011). Here also the diagram becomes a way of grasping the dynamic, processual arrangement of immanent forces, exemplified in the work of the artist Francis Bacon (Deleuze, 2002). At the same time, Deleuze's own writing, both with and without Guattari, is full of little diagrammatic

sketches that complement the abstract conceptual machines populating their texts (see, for example, Deleuze, 1993; Deleuze and Guattari, 1988).

Fourth, the diagram provides a way of foregrounding the relation between abstraction and aesthetics, a concern with which is an important element of non-representational theories (McCormack, 2002; Rycroft, 2007; Thrift and Dewsbury, 2000). On one level, as noted above, these theories encourage the development of conceptual abstractions that allow for thinking through the abstract qualities of experience, but they also encourage experimentation with the more-than-representational qualities of aesthetic abstractions. Admittedly, the question of aesthetics raises the prospect of an artistic avant-gardism whose representational experimentalism is a manifestation of the violence and brutality of abstract space: this is precisely the charge levelled (perhaps wrongly) at Picasso by Lefebvre, for instance. Clearly, for geographers interested in exploring the everyday, *abstract art* has traditionally posed a challenge because it seems to lack 'any readily identifiable connection between the work and the world it inhabits' (Crouch and Toogood, 1999: 71). Yet aesthetic abstraction can be understood more generously. As Crouch and Toogood (1999) argue, 'abstract art' can work as a site-specific practice for producing a kind of poetic geography of everyday worlds. This sense of abstraction is, they argue, exemplified in the work of the Cornish artist Peter Lanyon, who engages in abstraction as a kind of 'geographical knowledge-making' (Crouch and Toogood, 1999: 85).

We might take this further by decomposing the diagram into one of its subcomponents – the line. A concern with the line runs through both artistic practice and academic scholarship. In art, the line has obviously functioned as an indicator of geometrical formalism, part of an economy of representation that seeks to faithfully represent the world through the visual architecture of perspective. But the line in art can also be a manifestation of creative variation, of a commitment to the detour as a way of delineating movement, evident in the work and writing of artists as diverse as Paul Klee (1953) and Richard Long (2005). A similar sense of the line as a kind of generative constraint for movement can also be found in the writing of Deleuze and Guattari (1988), for whom creative variations in the material of the world can be apprehended in terms of wanderings from home on lines of variable speed and intensity (see Manning, 2011). This sense of the line also runs through the scholarship of writers including Tim Ingold (2007) and Paul Carter (2009). So, for Ingold, the line does not so much represent the joining of fixed points on a territorial or inscriptive surface, but can be understood as a trace of the process of wayfaring. For Carter, thinking through the line is a crucial element of a spatial history, one that goes beyond a critique of the line as a technology of static abstraction juxtaposed to the lived and instead affirms it as part of what makes experience human in the first place. Thinking the line through its rhythmic variations opens up the possibility that designs might become abstractions that 'make room for things to happen. They should be scores that mediate between the abstract and the actual, encouraging improvization' (Carter, 2009: 15). For Carter, this is not just a technical challenge, but a social, ethical, and aesthetic one. To engage in drawing lines is therefore to contribute to the elaboration of a geo-aesthetics that works in the hidden 'linings' (Carter, 2009) of abstraction in order to render them imaginable and inhabitable in different ways (see also Colloredo-Mansfield, 2011). One important rider: if this emphasis on the aesthetic can seem arcane, it nevertheless can be understood in relation to a wider question of how to generate aesthetic abstractions that are not subsumed by the politic-economic imperatives and indifference of capitalist forms of life. In this context, an important question becomes: what kinds of aesthetic abstraction might provide for the

cultivation and proliferation of forms of life that are not defined by the market (Negri, 2011; Toscano, 2009)?

This question hints in turn at a fifth important element of the diagram: the fact that it provides a way of thinking through the relation between abstraction and power. Reading Deleuze (1999) in a more Foucauldian vein means that the diagram becomes a conceptual abstraction with which to draw out the technical and political constituents that form the background for emerging forms of life and experience in contemporary liberal democracies. For instance, exploring 'diagrams of power' (see Amin and Thrift, 2002) provides a way of holding onto the claim that cities are organized in complex ways without necessarily explaining this organization via an appeal to hidden structures (see also Osborne and Rose, 1999). Elsewhere, the diagram has been used to think about the possibility of generating political spaces involving human and non-human constituencies. As Steve Hinchliffe, Matthew Kearns, Monica Degan, and Sarah Whatmore (2005) have argued, thinking diagrammatically can contribute to the enactment of a cosmopolitical practice for more-than human-worlds. They make this point when reflecting upon the difficulties of 'representing' water voles. As they observe:

> We are not sure that representation is the best term to grasp this complex of activities and interactions. An alternative would be diagramming … which, for us, conveys a sense of 'writing around' water voles. Field guides, for example, write around rather than write up, once and for all, their object. Learning water vole writing involves rapid movements between texts, descriptions, field signs, conversations, comparisons, finding similarities, explaining differences, and so on. To be a good reader requires a form of expertise that can combine multiple indications of presence, a looser kind of sense, a knowing around water voles, a diagnostics, and a diagramming. (Hinchliffe et al., 2005: 648)

Such work suggests that an affirmative critique of diagrammatic thinking for mapping the affective relations of a more-than-human world would not seek to deny or to expunge the abstract quality of the diagram. It also suggests that it is a mistake to think of the diagram as a fixed, homogeneous, or universal mode of abstraction. Rather, it encourages us to rethink the diagram as abstract in different ways, and to different ends: an important 'achievement with a price' (Stengers, 2008: 100).

VI Conclusion: towards an affirmative critique of abstraction

Thus far I have pointed to the possibilities for rethinking the relation between the lived and the abstract by revisiting questions of experience and materiality. My aim has been to demonstrate that the opposition between the lived and the abstract is insufficiently nuanced to grasp the ways in which abstraction participates in processes of world-making. In this extended conclusion, I want to develop this further by outlining the terms of an affirmative critique of abstraction. An affirmative critique is an ethico-political disposition towards the world that does not allow the terms of critique to foreclose an ethos of presumptive generosity towards the object of this critique (see, for instance, Anderson and Harrison, 2010; Bennett, 2001; Connolly, 2005; Latour, 2004). It is responsive to the possibility that the very terms informing critique might always be in need of critical revision. It accepts that the reference points of critique are only really meaningful when being put in a potential condition of risk through encounters within the world (Stengers, 1997). It also affirms that the ethical-political horizon of critique is never determined in advance: instead, this horizon is always potentially open.

An affirmative critique of abstraction is based upon a number of relatively uncontroversial propositions. The first is that abstraction is differentiated: there are more ways than one of being and becoming abstract, and abstraction

participates differentially in processes of thinking, feeling, and perceiving (see Rajchman, 1998). Thus, abstraction might well be understood – critically – as a mode of withdrawal from the world. Equally, if we accept that the world is already withdrawn from us, then abstraction provides a way of drawing out elements of the world in ways that make them thinkable and sense-able. The second proposition is that rather than a static representation, abstraction is a process practised in context-specific ways. So rather than identifying – or indeed dismissing – generalizable abstractions, an affirmative critique is concerned with the 'localized and risky emergence of abstractions' (Toscano, 2008a: 65). Crucially, and third, this critique is motivated by the necessity of explaining how abstraction works as a participant in the process by which materialisms come to matter, rather than explaining away abstraction in order to get at the real materiality of concrete experience.

An affirmative critique of abstraction also involves ongoing attentiveness to the kinds of abstractions around which certain habits of thinking cohere, with the view to reform or rework both. While I have taken some orientation from elements of the work of Henri Lefebvre, the writing of Alfred North Whitehead (1967, 1978), and subsequent commentary by Isabelle Stengers (2008), is also particularly instructive here. As Stengers makes clear, one of the central aims of Whitehead's philosophy is to reveal the role of abstraction in allowing patterns of thinking to 'succeed in holding together and in maintaining themselves' in the manner that societies do (Stengers, 2008: 107). The problem for Whitehead is that western thinking has become dominated by generalizable abstractions set apart from the conditions of their production. In this sense, the question of abstraction is always a question of metaphysics, albeit not a metaphysics of transcendence. The task, then, is not to try to escape abstraction via a misplaced appeal to the immediacy of experience. Rather, it is to critique the dominant cultures of abstraction in the western world by correcting a fundamental misunderstanding of what abstraction does. In Stengers' reading, Whitehead's abstractions are not 'abstract forms' that determine what we feel, perceive, and think, nor are they 'abstracted from' something more concrete; finally, they are not 'generalizations'. Rather, they 'act as "lures", drawing attention toward "something that matters"' (p. 96). Lures draw attention towards certain elements of the world at the same time as they draw out those elements in ways that make them available for experiment. Understood thus, Whitehead affirms the possibility that generating new techniques and technologies of abstraction might allow for new modes of thought and feeling which, in turn, could disclose the potential of novel worldly arrangements (see also Carolan, 2009; Massumi, 2011).

In concluding, then, how might this kind of affirmative critique fold into the concerns of contemporary human geographic research? The first way is through encouraging greater attention to the generative role that abstraction plays in disclosing and giving consistency to different kinds of worlds. Consider, for example, the relation between abstraction and the production of inhabitable or 'actionable' worlds (Goede and Randalls, 2009) oriented around speculative futures. Here abstraction is constitutive of worlds through implication in at least two kinds of virtualism. In the economic arena, virtualism refers to the ways in which economic activities and practices are organized in the light of economic abstractions (Carrier and Miller, 1998). As Mann (2009) notes, these abstractions are not fictions – they are made present as real processes. Elsewhere, as Leyshon et al. (2005: 428) argue, these abstractions are not just produced by economists: they are 'mobilized by a heterodox group of actors, including academics, consultants, journalists and practitioners'. Furthermore, the sheer existence of economic abstractions, such as 'e-commerce' itself, are

not sufficient: they must be taken up by a range of practical actors, becoming akin to refrains that circulate through different sites and practices as part of the taken-for-granted background of economic and organizational cultures. The role of abstraction is also crucial to the articulation and imagination of actionable futures through which to intervene in and manage a range of contemporary risks and threats. Abstraction is a matter of virtualism here insofar as it has as its object the unknown unknowns of potential futures. For example, models and scenarios allow these futures to be drawn down into the present as objects of action and intervention. Crucially, these abstractions are also implicated in the generation and governance of distinctive kinds of affects, particularly hopes and fears (Anderson, 2010).

Second, an affirmative critique of abstraction encourages ongoing examination of the kinds of conceptual abstraction employed by geographers and the role it is assumed to play in and for thinking. For instance, in a recent discussion, Jazeel and McFarlane (2010) have drawn attention to the need to remain vigilant about the relation between abstraction and the limits of responsibility in geographic research in transnational contexts, where the temptation is to cleave to certain kinds of theoretical universalism. At the same time, as they note, 'abstraction is a valuable tool, often necessary for those involved in the transnational academic research endeavour', allowing one to 'pin down points of identification, difference, good practice or anomaly between and across … diverse case studies' (Jazeel and McFarlane, 2010: 112). Ongoing interrogation of the Marxian tradition also remains important here, not least because it is within this tradition that the question of abstraction as both an object of critique and a necessary element of thinking – both conceptually and politically – has been debated most explicitly (Castree, 1999; Harvey, 1995). Equally, it is within this tradition that the question of what it means to take seriously the real materiality of abstraction is also foregrounded in ways that continue to pose challenges to geographical thinking. At the same time, the more recent influence of other thinkers within the discipline poses additional questions about the role of abstraction. Here the work of Alain Badiou is particularly interesting (e.g. Dewsbury, 2007). As Stuart Elden (2008) has observed, to engage with the formalism of Badiou is also to embrace abstraction in a way that seems to rehearse the kinds of faith in numbers and models that characterized geography's quantitative turn.[6]

What matters here is perhaps less a definition of what abstraction actually is, but the kinds of work that abstraction is understood to do. So abstraction might be conceived in terms of how it fixes, universalizes, alienates, etc. Equally, however, it might be understood as an important element of speculating and experimenting with and within worlds of process and becoming: in Gregory Bateson's (1941: 55) terms, abstraction gives consistency to that strange 'combination of loose and strict thinking' that characterizes conceptual thinking. Similarly, following Isabelle Stengers, the aim of experimenting with abstraction might not be so much to 'produce new definitions of what we consensually perceive and name, but to induce empirically felt variations in the way our experience matters' (Stengers, 2008: 96). For instance, concepts, as a kind of speculative abstraction, might also be understood in terms of how they affect us and, in doing so, modify our capacity to affect and be affected by other agencies and forces in the world – after all, this is one of the central aims of Lefebvre's rhythmanalysis (see Lefebvre, 2004). Also, as Whitehead reminds us, certain kinds of conceptual abstraction have the potential to make us more, rather than less, sensitive to the world in the way that others do not. Conceptual abstraction makes a difference akin to the experience of learning a new move that opens up novel possibilities in a field of activity, and it fails insofar as it is not productive of such novelty. The adequacy of geographical

abstraction is not therefore the degree to which it describes the world, but how it moves us to think differently about what is possible within the world and about what abstractions are capable of (see Rajchman, 1998). To experiment with abstraction is not to move thinking away from the material: it is to do something with material effects – 'in the final analysis, something really *happens* when abstraction takes place' (Toscano, 2008b: 279).

Third, much more can be done in experimenting with abstraction as a methodological technique. So much of methodological work is premised upon the need to avoid abstraction as far as possible. In this respect, geographers continue to explore possibilities for going beyond, or becoming 'more-than-abstract' (Roth, 2009). But what if we more fully embraced abstraction as a technique of foregrounding aspects of lived experience in ways that would otherwise not be possible? Notable here, for instance, is recent work in GIS on how that set of technologies can become part of feminist geographers' engagement with affect and emotion (Kwan, 2007). A final and related way in which an affirmative critique of abstraction can fold into the concerns of geographers is through encouraging a more expansive and generous sense of the ethical and political spaces in which abstraction participates. On one level the political task for many geographers remains one of exposing and producing counter-narratives to the violent geo-economic and geo-political abstractions of global finance (see Mann, 2009; Wilson, 2011). As Noel Castree (1999: 156) puts it, certain kinds of Marxian abstractions remain necessary for thinking and envisioning capitalism because they 'can identify features common within or between peoples and places, their other differences notwithstanding'. On another level, the task is to expose the ways in which contemporary biopolitical regimes find purchase in everyday life though abstractions that organize a range of mundane practices and behaviours from fitness (Evans and Colls, 2009) to flying (Budd and Adey, 2009).

At stake when questions of abstraction are discussed is not only the 'level' of abstraction or, indeed, the question of how to reconcile reliance upon abstraction with commitment to human struggle (Harvey, 1995). Any affirmative critique of abstraction needs to embrace the possibility that abstraction can also provide potentially inhabitable collective spaces that resingularize political experience (Bamyeh, 2010). Equally, it provides opportunities for experimenting with what counts as a political space. For instance, technologies of abstraction such as measurement have the potential to play an important role in revealing matters of concern and enabling different constituencies to participate in the distribution of their effects (Whatmore, 2009). Equally important therefore is a micropolitical realm in which generative abstraction provides opportunities for minor experiment with immanent forces in the world (McCormack, 2005; Manning, 2009). Within this context the task might be to produce forms of abstraction as 'occurrent arts' (Massumi, 2011) that draw out elements of the world in order to make them available in and for thinking. In the process geography might well become *more* abstract, not only in order to be able to grasp problematic operations operating at very large geographical scales (Castree, 1999), but also to grasp the many scales at which abstraction participates in the generation of the worlds we inhabit.

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Notes

1. This space is a product of a distinctively modern alignment of state power, philosophy, and technologies of representation. It is composed of three elements or 'formants': the geometrical, the visual or optic, and the phallic. The first of these formants is underpinned by the absolutism of Euclidean space, and is demonstrated every time three-dimensional realities are reduced to two dimensions through drawing, mapping, or graphing. The second formant refers to the process by which the visual becomes the dominant and privileged mode of sensory engagement and judgement in western societies. The phallic formant, understood by Lefebvre to be masculinist, involves the forceful occupation (symbolic and/or physical) of space.
2. This understanding of abstraction as an alienating technocratic instrumentalism is also present, for instance, in Michel de Certeau's critique of the city as an abstraction populated by 'a multitude of quantified heroes who lose names and faces as they become the ciphered river of the streets' (1984: iii). It can also be seen in Paul Virilio's ongoing commentary on the disenchanting and dematerializing effects of new configurations of technology, perception and politics (1991, 2005).
3. As Clive Barnett remarked in a review of *Geographical Imaginations*, 'any sense of abstraction as a positive human capacity, embedded in social and historically determined social practices, is lost in Gregory's rehearsal of Lefebvre, and this enables him to criticize Harvey on the grounds that his mode of theorizing partakes too much of abstraction' (Barnett, 1995: 433).
4. Yet Lefebvre insists that unlike, for instance, Merleau-Ponty (1962), his own work is impelled by a critique of lived experience designed to identify the conditions for change in this experience.
5. As Cunningham (2005) has argued, Lefebvre tends to conflate two senses of abstraction in Marx: concrete abstraction, which involves a movement from thought to practice; and actual or real abstractions constitutive of social worlds and which exist prior to their conceptualization.
6. The value of quantification itself is also being revised in a way that refuses to juxtapose it with critical or creative thinking (see, for instance, Kwan and Schwanen, 2009).

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