

**Containing (Dis)order:
A Cultural Geography of
Distributive Space**

by

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Declaration of Authorship

I, Craig Martin, hereby declare that this thesis and the work presented in it is entirely my own. Where I have consulted the work of others, this is always clearly stated.

Signed:

Date: **26 July 2012**

Abstract:

This thesis focuses on the significance of distributive space for understanding capitalist forms of spatio-temporality. It argues that the distributive phase of commodity mobilities has remained a relatively under-represented aspect of social theory, especially in the context of cultural and social geography. The extant work that has focused on distribution tends to be confined to the areas of economic and transport geography. The thesis aims to address the importance of this space for understanding the formations of late capitalist modernity, particularly its role as a specific, but networked space between production and consumption.

Significantly the work addresses the ‘construction’ of this space by focussing on the substantive case study of containerisation. In doing so it engages with global commodity mobilities in the form of intermodal shipping containers, and their attendant logistical infrastructure. The research critically considers the spatial and temporal apparatuses that have been developed to organise and order the mobilities of the containers; including the design and development of the object itself, alongside a range of logistics and supply chain management strategies.

In theoretical terms an important influence on the research has been Michel Serres’ work on the interlacing of order and disorder. Given this, a simultaneous focus of the research deals with the immanent presence of disorder in these systemic environments; thus reflecting an intellectual engagement with theoretical work in the areas of turbulence, complexity theory, assemblage theory and Serres’ work on the parasite. Substantively this aspect of the research has been determined by considering the place of the accident within networks and systems, alongside the ‘tactical-logistics’ of smuggling practices.

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Introduction

Relations and Interconnections:

In his book *Angels: A Modern Myth* the French philosopher Michel Serres (1995a) constructs an intricate meshwork of connections between religious messengers; satellite communication technology; speech acts; the movement of objects; and transportation technologies such as supersonic aircraft. Angels, in the monotheist tradition, are messengers who carry messages flittingly through the ether, often revealing themselves unannounced. From this perspective he argues that, “when people, aircraft and electronic signals are transmitted through the air, they are all effectively messages and messengers” (Serres, 1995a:8). Serres is describing a vast web of relations in connective space, and whilst he may be criticised for levelling the differences between such forms of connection (notably in terms of the mythical-religious qualities of angels), he offers us, rather tantalisingly, an image of contemporary spatiality in all its potentiality. In numerous other works (1995b; 1995c; 1997; 2006; 2007; 2008) he has explored a similar territory of relations, employing an array of spatial ‘characters’ to do so (also see Bingham & Thrift, 2000). For example, Serres (1982c) sees bridges as critical spatial characters, for they both connect and disconnect, linking and separating simultaneously (also see Heidegger, 1971; Simmel, 1997). Their connective potential is clear in that they make “a discontinuity continuous, or that [it] crosses a fracture” (Serres, 1982c:42). The bridge is an image of connection, pulling together distinct spaces, but also a representation of the divide itself. In *The Natural Contract* (1995c) Serres draws a series of relations between agricultural tools, animal husbandry, mountain climbing etc. These are concerned with the contract as a form of tethering or bond as socio-spatial relations (see Paulson, 2005:27). Above all, this book attempts to extend the social contract into a contractual obligation between humans and nonhumans—the relations that tie things together. Serres’ re-examination of this book in his essay ‘Revisiting *The Natural Contract*’ (2006) made it clearer still that such interrelationships were evermore urgent (also see Serres, 2011). Here he also offered a

telling image of the power of another spatial character in mediating global spatialities—that of the “world-object” (Serres, 2006). Typified by objects like telecommunication satellites, these have the ability to make the global. They create the spatial relations that we live by: “we now live in those world-objects as we live in the world” (Serres, 2006). Although these various spatial characters are distinct in their material and immaterial forms; they are all carriers of information; they are all mediators, conduits and channels of *relation*.

This thesis deals with interconnections and relations. They are at its core. Of course, as Serres’ work illustrates, the notion of relations covers a broad range of potential applications, and thus demands greater specificity and localised analysis. Serres’ milieu is made up of messages and messengers, of images, objects, people and ideas in movement, and this is where the central thrust of this thesis resides – in this space of interconnection and relations, and particularly the space of *distribution*. Such a space is inherently complex and made-up of a multiplicity of actors. By ‘distributive space’ I refer expressly to the mobility of commodities as a definite space within the networked relationships across the geographies of production and consumption. Although the rationale for this as a distinct field of inquiry will be articulated in much greater depth in the *Contextual Introduction*, it is necessary to briefly substantiate this. According to Walker (1989) distribution has an inherent relationship to production and consumption, as a circulatory space. At one end of the scale we see, for example, the circulation of information through marketing, advertising, mail order, or trade fairs. At the other end, circulation is framed around material distribution in the form of the packaging of goods, their physical distribution to warehouses, stores, shops and markets. Both bear directly on production and consumption. It is the latter aspect that particularly concerns us here. Again, in the context of material distribution there are numerous sites and spaces of circulation, from the physical distribution of mail or parcels (Thrift, 2004b), the architecture of distribution

centres (Pawley, 1998), the social function of retail environments (Benjamin, 1999a; Miles & Miles, 2004), the personal geographies of courier drivers, to virtual shopping (Currah, 2003). Likewise, it would be disingenuous to suggest that these are solely contemporary phenomena, for a rich history of trade already exists (Braudel, 2002; Parker, 2010; Robins, 2006; Tracey, 1990), many of which outline the inherently complex relationships between the circulation of goods, imperial power and geopolitics. This study deals directly with a substantive case study that is part of the genealogy of such historical geographies, namely that of containerisation.

For David Harvey the development of intermodal containerisation was “one of the great innovations without which we would not have had globalisation, [or] the deindustrialisation of America” (Harvey, cited in Buchloh, Harvey, & Sekula, 2011; also see Harvey, 2010:16).¹ Where the spatio-temporal logic of containerisation has profoundly altered the economic geography of U.S. labour markets, this has also been the case in numerous other contexts, including the maritime industry as a whole (Sekula, 1996), labour relations at ports, and the cultural and social geographies of traditional port cities. The container is also a mundane thing. They punctuate many a motorway journey; they trundle through train stations on the back of freight wagons; they lie in farmers’ fields and scaffolding yards where they serve as makeshift sheds and workshops; they are used as dwellings; and they figure in post-Punk lyrics (Smith et al., 1980). They are ubiquitous, but often ignored. And as a result this speaks to Harvey’s desire to critically interrogate the role of containerisation, but particularly the immense power of this industry and these objects in relation to global trade and thus contemporary capitalism. In early 2011 there was a global fleet of nearly 5000 container ships, carrying an equivalent of 14 million containers (Institute of Shipping Economics and Logistics, 2011:5). All this

¹ Intermodalism is defined as “the use of at least two different modes of transport in an integrated manner in a door-to-door transport chain” (Organisation for Economic Co-operation and Development, 2001:7; also see Jennings & Holcomb, 1996).

seems rather remarkable given that the shipping container is a relatively simple piece of design, consisting of the widely used standard sizes of 20, 30 and 40 foot lengths, and constructed from steel.

The history of containers and the system of containerisation has been relatively well documented by maritime and shipping industry historians (see Broeze, 2002; Cudahy, 2006; Hunter, 1993; Levinson, 2006). My intention is not add to this historical literature, rather my rendering of the shipping container comes out of its potential function as a *spatial character* (in the Serresian vein) that indexes the social, economic and political shifts described by Harvey and others (Levinson, 2006; Shaw & Sidaway, 2010:509). As a spatial character the container works across a variety of scales and registers. On the one hand it draws out discussion of seemingly mundane design decisions such as the sizes of the container, or the corner fittings (as we shall see in *Chapter One*). However, a key conceptual interest for me is how these taken-for-granted, mundane objects and designs are decidedly complex articulations of the dynamics of contemporary capitalism. In particular it is clear that such spatial-material devices are an invisible backdrop to the make-up of twentieth and twenty-first century global processes (Sekula, 1996). And as such they demand critical attention. For as Harvey again suggests, “we may not even notice the material qualities of spatial orderings incorporated into daily life because we adhere to unexamined routines” (Harvey, 2006:280). This could be applied to a vast range of potential case studies, and of course has. My own interest in distributive space, and the container as one facet of this, lies in the ultimate power it has to mediate—through the various spatial and temporal orderings discussed in this thesis—our daily lives in relation to the production and sustainment of consumer capitalism. The container also provides a lens for the consideration of the complex web of relational connections described by Serres. It is intertwined in the development of an arsenal of strategic technologies and techniques to control the mobility of commodities on a global and local

scale. It simultaneously ‘contains’ order and disorder: as we shall see in *Part One*, subsumed within the standardised design of the container are spatial, material and technological mechanisms to stabilise (Law, 1991) the interconnections across the system of containerisation. As discussed in *Part Two*, immanent to these forms of stabilisation are potentially deleterious forms of disorder, in the guise of container accidents; the potential use of containers for ‘terrorist’ purposes; and narcotics and tobacco smuggling.

Overall, the key aims of this thesis are to define the specific apparatuses that have been developed to stabilise the global mobilities of commodities through an analysis of the shipping container and containerisation. It is also concerned with establishing a critical approach to the role of distributive space more broadly within the established literatures on production and consumption. In particular it seeks to develop a social and cultural approach to this space, as related to, but also distinct from extant literature on distribution (Cooper, 1993; McKinnon, 1985; Rushton, Oxley & Croucher, 2000; Wrigley, Coe & Currah, 2005). The thesis also seeks to consider such problematics through a set of theoretical perspectives that coalesce under theories of complexity—notably via the enmeshing of order and disorder. Whilst the thesis is inevitably positioned within an extant discursive realm consisting of mobility studies; design theory; sociology; social, cultural, political, and, to an extent, economic geography; it advances these literatures by engaging with the theoretical discourses already described. In the specific context of mobility studies, although there is an established body of work on corporeal mobilities (Bissell, 2010; Middleton, 2009), automobilities (Featherstone, Thrift & Urry, 2005; Merriman, 2007; Packer, 2008), aeromobilities (Adey, 2010), cycling (Spinney, 2006), foodstuffs (Cook & Harrison, 2007), there has been a limited approach to the specific example of packaged commodity mobilities. When this has been engaged with (Urry, 2000; Easterling, 2005; Bello, 2008) the substantive nature of the container has not

been fully interrogated, particularly through the issues of modes of ordering, materiality, and complexity.

A Note on Methodology:

The intention of this section is to briefly outline the overall methodological ‘timbre’ of this study. In doing so there is a caveat to be noted: overall I adhere to the points raised by Harari and Bell (1982:xxxvi) regarding the problem of method in particular. They argue that methods are problematic due to the implication that they can be repeated and tested out in order to validate research findings. They also state the nature of method is that it is predictable. Given the context of their discussion—the work of Serres—they argue that method is an inappropriate term, and call his approach an *anti-method*, in the sense that it is inventive (also see Bingham & Thrift, 2000:293). Equally, as much of this thesis is concerned with the interplay of stability and instability, order and disorder, to outline a strict series of methods seems inappropriate. Rather I wish to briefly outline certain influences on the overall *approach*.

Primarily, my approach is driven by the interpretive lens of theoretical inquiry. This is not to subscribe to certain means of viewing theory as the segregation of “ideas from the particularities they refer to and the social experiences that generated them” (Johnson et al, 2004:88). Although such approaches to theoretical inquiry can be tautological (see Graham, 2005:261), there are important distinctions to be raised with regard to the alternative ‘practice’-based approach. Firstly, that there is any difference between theory and practice in a teleological manner is questionable (see Abend, 2008). Secondly, and more fundamentally, to argue that ‘practice’ any more than ‘theory’ has an ability to decipher the truth from the world-out-there is highly troubling. This is what Whitehead calls the ‘instinctive conviction’. The following provides apt means of challenging the assumption that research (of any kind) unlocks a discoverable ‘truth’:

“I mean the inexpugnable belief that every detailed occurrence can be correlated with its antecedents in a perfectly definite manner, exemplifying general principles. Without this belief the incredible labours of scientists would be without hope. It is this instinctive conviction, vividly poised before the imagination, which is the motive power of research: that there is a secret, a secret which can be unveiled” (Whitehead, 1967:12 cited in Prigogine & Stengers, 1984:47).

Whitehead’s critique offers the researcher a valuable outline of the limitations of any research to really ‘get at’ their chosen object of study. Needless to say this does not invalidate research inquiry *per se*, rather it is an honest reflection of what can and cannot be achieved. Inevitably then, my approach is open and speculative, especially in terms of Thrift’s assertion that social theory is “an art of controlled speculation, not [...] a faithful rendition of what may be going on, as if that were indeed possible” (Thrift, 2008:255 n.3).

Give my description of the shipping container as a spatial character there is an important object-centred approach to this thesis. As such, a final approach to signpost is related to recent debates on neo-realist ontologies (DeLanda, 2006). These provide a valuable means of thinking through the materialist-turn of cultural geography (Anderson & Wylie, 2009) and my own interest in spatial-material relations. In a methodological context DeLanda’s work re-asserts the mind-independence of matter, which, following the lessons learnt from Actor Network Theory (Latour, 2007) can be used to value the power of nonhuman entities to affect space-time. Although it is never named as such by DeLanda, I align these arguments with Serres’ work on the ‘quasi-object’ (Serres, 2007). Principally this is an object that demarcates spatial and social relations. Serres’ discusses this in terms of a rugby match, stating that the true object of the rugby match is the ball, rather than the players. This is the case given that “the ball is played, and the teams place themselves in relation to it, not vice versa” (Serres with Latour, 1995:108). He goes on to add, “it is like a tracker of the relations in the fluctuating collectivity around it” (Serres with Latour, 1995:108). We have here a key example of how the complexity of mobility is

demarcated by the quasi-object. The object, far from being a blank screen that we project onto determines the cords of relations. Practically speaking, the relationality of the quasi-object thus enables a map of the object relations of movement-space to be constructed. Whilst this notion of the power of objects to mediate spatio-temporal relations is an important influence in my conceptualisation of the shipping container, the quasi-object does of course have drawbacks. Just as the discussion above outlined the limitations of discovering some semblance of truth in relation to an external world, a ‘map’ of the relations of the quasi-object is inevitably a simplification of its complexity (see Hillman, 2008). Similarly, my own renderings of the spatial-material relations of the shipping container are only ever going to be partial.

Thesis Outline:

The thesis consists of two parts, the first deals with modes of ordering, the latter with disorderly relations. Both consist of an initial interlude that outlines the conceptual foundations for the following two substantive chapters. Given the conceptual foundations discussed above with regard the entanglements of order and disorder, it may seem somewhat counterintuitive to separate the two main parts into ‘order’ and ‘disorder’. This requires a brief explanation. It was deemed appropriate to do so in order to demonstrate the continued powerful legacy of specific forms of Enlightenment and Modern ideology that have privileged stability and order over uncertainty and disorder. I do not hold to such an ideology, but rather favour acknowledgement of their mutuality. So although the thesis is structured according to an established figuration of order and then disorder, each of the four substantive chapters (as well as the two interludes) are populated by numerous cases where they cannot be disentangled. In order to outline the specific aspects of the central claims outlined above, I turn to the key arguments in each chapter.

In light of the potentially broad scope of distributive space as a field of study, the intention of the *Contextual Introduction*—which precedes the two main parts—is to situate this within an established set of discourses, primarily studies of production and consumption. The key claim in this section is that although these two facets have been studied in great depth across a range of disciplines, including design theory, anthropology, economics, sociology and geography, there has been comparatively little work on the specificities of distributive space. Whilst this is a central aim of the overall thesis, the rationale for doing so is more fully unpacked in this section. In particular it is deemed important to situate the issue of distribution within the context of Marx’s work on circulation, primarily as this is a benchmark for the mobility of capital in a variety of forms. Crucially, Marx recognised the significance of transportation and communication to the productive realm of capital, and I locate this as a critical point of reference for my rendering of distributive space. Given the historical moment of Marx’s work on circulation this is positioned within more recent debates on globalisation (Dicken, 2011). Given the complexity of this vast field only a limited set of discourses can be engaged with, and in particular I focus on the significance of post-Fordism and the impact on the geographies of global production networks. Through a variety of registers, including the shift from nationally-bounded forms of integration to global networks of production, through to flexibility in relation to both production (particularly just-in-time modes of production) and labour, as well as the importance of information, communication and transportation technologies, the core argument here is that the shifting geographies of production has demonstrated the increasing importance of the mobility of finished commodities, raw materials and other resources, and thus the immensely powerful role of distribution in the world economy. In part, this link between production and distribution is discussed in the context of a body of literature on commodity chains geography (Hughes & Reimer, 2004). This work sees complex narratives emerging out of the

interconnections between the multiple spatialities of production, distribution *and* consumption. However, whilst I adhere to the networked relationship between each of these phases, given the lack of focus on distributive space, my own approach bears a much stronger adherence to Mike Crang's (2002:569) call for the need to address specific sites and technologies of mobility, akin to Marx's notion of the 'locational moment' of circulation.

Effectively then, the aim of the *Contextual Introduction* is to provide a foundation upon which the rest of the thesis may be developed. Building on this, *Part One* attempts to discuss the various 'modes of ordering' that have been constructed and maintained as part of distributive space. To articulate the legacy of order within wider social, spatial and temporal registers *Interlude I* sets these out in the context of how order has been conceptualised, notably within Enlightenment thinking. However, I offer a critique of this via Law's (1994) work on *orderings*. Rather than a singular order, identifying various modes of ordering offers a more realistic image of the multiple forces of orderings. Even with such a position it is argued that order and disorder are positioned as opposites, with disorder viewed as requiring forms of control through separation. This is developed in light of two fundamental conceptualisations of space and time, namely absolutist and relativist readings. Using Harvey's (1996; 2006) work it is argued first of all that under classical thought absolute space *and* time are seen as passive and thus governable. The implications of relative space-time also have a strong bearing on modes of ordering. In particular where orderings are constructed and maintained a concomitant assertion with regard to relative space-time is evident. So rather than the passive quality of absolute space and time, relative space-time is active, but is still concerned with governance and control.

Chapter One deals directly with the genealogy of containers and containerisation. As stated above, this thesis is not a history of containerisation, however I attempt to situate

the discussion of spatial-material relations within a wider timeline of modes of ordering and organisation of space-time. Whilst the impact of containerisation has been immense, a key facet of this chapter is that earlier practices of cargo handling and packing employed specific, localised forms of organisation. There were also numerous cases where prototypical forms of regularisation were in evidence, including the use of pallets and early forms of container, all of which homogenised the shape of break bulk cargo thus making it easier to handle and load. However, the decisive difference between these earlier forms and the later standardised containers was the lack of universal design and the lack of systemic compatibility across various forms of freight transport. Through a delineation of the development of the standardised shipping container a key focus of *Chapter One* is the role of standardisation in codifying a globally recognised system of freight mobility that enabled freight to be shipped from door-to-door, thus linking land and sea transport. The fundamental idea here concerns inter-changeability and compatibility across various transport platforms. The envisioning of a *system* of inter-changeability and flow is discussed in relation to earlier forms of organisational logic, but the primary postulation of this chapter is that such forms of interchange had to be stabilised through specific material devices including the design of the container corner fitting—these I term forms of ‘packaged efficiency’. Conceptually this is framed around two key ideas from Latour, those of black boxing (Latour, 1987) and delegation (Latour, 1992). In order to unpack these issues more fully the chapter also deals with container mobilities at a specific port space, that of London Thamesport.

The remit of *Chapter Two* is to develop this material on organisational logic, and to address the wider structural changes that have emerged through and alongside containerisation. The overarching focus is on the increasing importance of logistics and supply chain management both in relation to the shipping industry but also beyond this, particularly with the legacy of military logistics (Axe, 2012; Cowen, 2010a; 2010b). So

whilst the role of ‘packaged efficiency’ is intrinsic to the arguments developed here, more importantly the wider ramifications of such practices are addressed, notably through the globalisation of spatio-temporal control instantiated through the shifts in global supply chains.² To this end the issue of interaction and stabilisation is a continued focus, and I deal with the spatial metaphor of the logistics pipeline in order to develop the idea of ‘contained continuity’. This refers to the securitisation of commodity flows. A significant mode of address for this idea is the role of infrastructure, and particularly the conceptualisation of this through Michael Mann’s work. Central to Mann’s thesis is that power is coordinated and channelled through infrastructure (Mann, 1986b:477). Following Allen (2003:39) we should note that the distributive reach of power does not simply flow smoothly through infrastructural networks, rather there is immense work that goes into designing, producing and maintaining such apparent effortlessness (Graham & Thrift, 2007). Building on this the chapter ultimately claims that through the shared heritage of military and commercial logistics we need to appreciate how infrastructural power is a form of invisible violence.

The need for continual maintenance of modes of ordering that threads through much of *Part One* is dealt with in *Part Two* via discussion of the interplay of order and disorder. To conceive of this tension between forces (see Patton, 2000:52), in *Interlude II* the focus will be on the amalgam of competing forces of order and disorder in relation to the theories of complexity, turbulence and assemblages. These debates provide an apt opportunity to explore how “order and chaos are in a kind of balance where the components are neither fully locked into place but yet do not fully dissolve into anarchy” (Urry, 2003:22). Using complexity and turbulence as a focus emphasises the different complexities of orderings (Michael, 2000:28). Developing out of the debates on

² Although the focus on logistics is from a critical stance, there are of course areas where the infrastructural power to mobilise resources is absolutely necessary, especially with humanitarian applications (Van Wassenhove, 2006).

turbulence is the potentially instructive work being produced under assemblage theory (DeLanda, 2006), where an assemblage of forces invokes the cacophony of interplay, acknowledging that there is never pure chaos or order, but rather an admixture of the two. Overall *Interlude II* is concerned with how relationality and relational space-time are forms of transformative openness, where the ability to stabilise such relations is overturned.

One of the most valuable assertions from theories of turbulence is that order does not prevail, but equally when disorder emerges new forms of order can also materialise. Turbulence also highlights the significance of localised singularities as opposed to overarching generalities. As discussed in *Interlude II* the notion of singularity has an important bearing on the theory of bifurcations, and the role of the bifurcation is a significant foundation for the debates in *Chapter Three*. Substantively this chapter takes the 2007 maritime accident involving the container ship the *MSC Napoli* as its focus. This event is read as a series of ‘hybrid conjoinings’, where the singularities of various instances coalesced to produce the accident. Not only did such conjoinings emerge in a spontaneous manner, they also point to some of the systemic weaknesses of the maritime shipping industry, notably in relation to the overloading of containers. These findings are related back to the issues of stabilisation in *Part One*. The chapter also offers a reading of the theory of the standardised accident, and suggests (partially via Locke, 1975 and Virilio, 2007) that forms of disorder are, at times, generatively productive. Partly as a critical lens which reveals the workings of distributive space, but in more grounded terms as a form of systemic recalibration through the emergence of order from disorder.

Chapter Four continues to deal with relationality but from a slightly different perspective than *Chapter Three*, which addressed forms of relationality through the chance couplings of bifurcatory emergence. The substantive focus is on the use of shipping containers as a ‘smuggler-object’, that is, as an illicit space for the purpose of both human

and nonhuman smuggling. The central thesis of this chapter concerns the epistemological rupture that all systems contain within themselves, so in this sense a continued focus is that of the entanglements of order and disorder, or more fundamentally here between stability and instability. The issue of stabilisation in relation to the apparent efficiencies of commodity flows is read through the concomitant parasiting of such flows through smuggling practices. Conceptually this is mediated via Serres' theory of the parasite (Serres, 2007). This 'creature' offers a valuable means of doing so, for Serres outlines firstly how the parasite nests on the flow of relations (Serres, 2007:53), but secondly he reads the parasite in terms of questioning forms of legitimacy in relation to the purported 'authenticity' of productive origins. I utilise the various readings of the parasite to argue that trade flows (or any flows) do not have an ontological legitimacy over and above any others, and that trade more broadly is entangled with forms of illegality. Ultimately the chapter addresses the issue of aporetic *openness*, in regard to the container as a smuggler-object, but also with the epistemological uncertainties seen with smuggling-logistics.

Contextual Introduction:

Locating the 'Locational Moment' of Distributive Space

Introduction:

“The commodity asks for nothing better than to appear. And appear it does – visible/ readable, in shop windows and on display racks. Self-exhibition is its forte. Once it is apparent, there is no call to decode it; it has no need of decipherment after the fashion of the ‘beings’ of nature and of the imagination. And yet, once it has appeared, its mystery only deepens. Who has produced it? Who will buy it? Who will profit from its sale? Who, or for what purpose, will it serve? Where will the money go?” (Lefebvre, 1991:340)

“Here in the USA, we go to Wal-Mart, to J C Penney, to Home Depot, and it’s magic: the stores are filled with everything we need, and more. Everything is just here – it is magic. We don’t think about it” (Aschemeyer, cited in Nordstrom, 2007:197 emphasis in original)

Lefebvre offers his reader an instructive lesson regarding the status of the commodity, including its reception, and production. His description highlights the inherent complexity of the commodity, from the relations of production, through its functional qualities, to the striking ‘spectacle’ of its presentation, and post-consumption rituals of ownership. However, there is a gap in this life-world of the commodity form. We need to ask a further question: *How did it get to these shop windows or display racks?* It did not simply materialise in these spaces. Rather the mobility of the commodity, its trajectory from the point of production to the retail environment, is treated with seemingly less importance. Although Lefebvre goes on to discuss the question of commodity distribution and the importance “of stores, warehouses, ships, trains, and trucks and the routes used” (Lefebvre, 1991:403), it is rather telling that the issue of distribution *per se* was not raised in his initial questions. It seems taken as a given: the mysteries of its ability to appear underplayed. Similarly, Aschemeyer highlights the apparent ‘naturalisation’ of the process of how commodities literally arrive in the stores that surround us. So, where the hidden

factors of production are imbued in the materiality of the commodity, or in the economic web of shareholder profit, the journey or mobility of the commodity seems to remain unaccounted for in these examples (although see Bello, 2008; 2010; Easterling, 1999a; 2005; Molotch, 2003).

Where the main *Introduction* has already outlined the overarching aims and objectives of this thesis, the function of this *Contextual Introduction* is to discuss the specific notion of distributive space, and to position this within an established set of discourses. Equally, it also aims to specify the modes of address adopted in this study, and to highlight how these differ from the extant work. In particular the intention is to locate distributive space in relation to the discourses surrounding production and consumption. The notion of consumer culture has, of course, been disseminated at length (Baudrillard, 1998; Bauman, 2007; Lury, 1996; Paterson, 2006; Slater, 1997; Tomlinson, 1990). Production has received significant academic attention, including the studies of production line technologies (Hounshell, 1984; Giedion, 1948), through to the geographical organisation of production (Coe et al., 2008; Walker, 1988). As the opening section of this chapter will argue the shifts in production technologies associated with globalisation have been dramatic, both in terms of their economic, social and political impact, but critically for this section, and the thesis as a whole, in relation to how this has affected the concept of distributive space. Such global processes have also profoundly altered the geographies of consumption and retail, particularly in relation to consumer-demand. We have seen academic interest in post-consumption rituals (Kopytoff, 1986), to more recent discussions of second-hand commodity cultures (Gregson and Crewe, 2003), and the networked trajectories of foodstuffs and various other commodities (Cook & Harrison, 2007). Whilst the wider notions of production and consumption have a critical bearing on contemporary capitalist spatialities it is the intention of this *Contextual*

Introduction and the thesis to call for the need to more fully address the distribution of commodities as a distinct space within the network of production and consumption.

Although we saw in the opening quotations that this was not wholly evident, there have been similar criticisms to my own. Wrigley for example, in the context of the literature on the economics of globalisation, has argued that, “*distribution* systems and industries are, at best, a very minor, and more frequently, a totally neglected topic” (Wrigley, 2000:292, emphasis in original). We need to consider why this has been the case, both within this literature and beyond. Perhaps a key reason for this has been the privileging of production within a Marxian perspective, emanating out of Marx’s conclusions that the transport or circulation of commodities (the distributive phase I speak of) belongs directly to the process of production, rather than having distinct importance in its own right (Marx, 1993:533). However, as the next section on the legacy of circulation in Marx’s work argues, although he was overtly focused on production his work has a significant bearing on the transportation and mobility of commodities, most obviously when he notes that circulation is a distinct “locational moment” (Marx, 1993:534) in the trajectory of the commodity form. I argue that the value of circulation in Marx’s work can be identified in more contemporary work that emerged out of the globalisation debates of the 1990s where there was an attempt to envision the networked constitution of commodity flows, including the ‘global commodity chains’ perspectives (Gereffi & Korzeniewicz, 1994). Discussions in this field, for instance, posited the inherent *distributedness* of commodity chains themselves, as they clearly stretched across geographical space, from production to consumption, akin perhaps to Law’s notion of the “continuous network” (2003a). The section following the discussion of Marx’s legacy goes onto consider the attendant importance of the work on commodity chains, circuits and networks. Although these differ in approach, in overall terms they help to appreciate the interconnected nature of production, distribution and consumption.

Whilst cognisant of the need to recognise the interconnectedness of the entire commodity sphere, demonstrated by the intricate, meshworked geographies of the commodity networks literature, part of the aim of this thesis is to recognise the infrastructural power of distributive space, through the lens of containerisation. In doing so the next section utilises Mike Crang's (2002:569) argument that specific spaces of mobility need to be studied in order to unpack their particular power geometries (see Toscano, 2011). My aim is also to consider the multiple, competing forces within such a space, both in terms of the logic of control, securitisation and organisation, but equally through envisioning this as a space of complexity, contestation and immanent fallibility. This point brings me to the closing arguments in this *Contextual Introduction*: where discussions of distributive space have been developed (see Cooper, 1993; McKinnon, 1985; Rushton, Oxley & Croucher, 2000; Wrigley, Coe & Currah, 2005), there are particular disciplinary modes of address that privilege an economic or industry standpoint. In suggesting such my intention is to address the arguments raised by the likes of Mansvelt (2005) and Hudson (2005) concerning the established means of analysing either production or consumption. As Hudson (2005:9) observes, there is a need to construct a more nuanced attitude toward the overall scope of commodity culture; one that does not necessarily privilege, as he sees it, a cultural-economy approach to consumption and a political-economy one to production. I seek to foster a similar line of reasoning regarding distributive space, by adopting a social and cultural geographical perspective (see Easterling, 2005). The final section of this chapter attempts to develop this specific mode of address by considering the theoretical approach of Thrift in his work on movement-space (2004a). It also locates the debate within the approaches of mobility studies and transport geography, and ultimately calls for the need to combine these various forms of address in order to analyse the complexity and networked specificity of distributive space.

Globalising Flows: The Backdrop to Production-Distribution-Consumption:

The production-distribution-consumption nexus is clearly part of a much wider set of historical, political and geographical processes. Whilst the following chapters will unpack these various aspects in the context of containerisation, to comprehend the critical importance of this spatio-temporal ‘troika’ it is important to situate these debates more fully at this point. In his discussion of Allan Sekula’s and Noël Burch’s film *The Forgotten Space* (2010), David Harvey describes how the movements of shipping containers suggest that it is possible to “ride across the surface [of the ocean] in an unruffled way and bring the world into a unity of production and consumption” (Harvey, cited in Buchloh et al, 2011). By doing so Harvey highlights both the power of containerisation, and an important spatial aspect of globalisation: that of the global flows of information, ideas, and goods in particular, between sites of production and consumption. Within the geographies of contemporary capitalism to raise the importance of the spatiality of flows is far from controversial (Ballantyne & Smith, 2011).³ It is an obvious point of reference. Of course, Castells’ (1996) work on the space of flows posits the image of a world defined by movement, over and above an *apparently* static notion of place (Cf. Perec, 2010). Although this has been critiqued (Dicken, 2011:62) it remains a foundational resource for discussions of mobilities and the interconnectivity of global processes. Similarly, Appadurai (1996) discusses the various ‘-scapes’ through which the constructions of contemporary society move. His five categories – ethnoscaples, mediascaples, technoscaples, financescaples, ideoscaples – all posit a picture of passage, of movement. As with Castells such flows differ from a sedentary view of culture and society, although the smooth transfer of cultural information, ethnicity, capital etc., require powerful technological, legislative, economic, and political apparatuses. In the

³ The notion of ‘flow’ has been a core spatio-temporal metaphor in human geography for some time. For example, in *The Geography of Movement* (Lowe & Moryadas, 1975) it is clear that these earlier concepts of flow differ from Castells’, and more recent, evocations of it. Instead, the quantitative *measure* of flow as a form of spatial interaction is a central interest (Lowe & Moryadas, 1975:159; also see Leinbach, 1976)

context of urban geographies Graham (2001:4) argues that “contemporary cities can be understood as socio-technical constructions supporting mobilities and flows to more or less distant elsewhere: flows of people, goods, services, information, capital, waste, water, meaning” (also see Easterling, 2004). This posits the critical function that distributive space has in terms of the means to mobilise and distribute various entities, and it also underlines the contemporary nature of *networked* flows.

Needless to say, the relationship between the production of commodities, their transport to market, and subsequent consumption, has a long, rich history. Just as Graham emphasises the socio-technical power of present-day urban agglomerations, so the growth of urban centres is intrinsically linked to trading patterns and routes. Equally, the mobility of goods and raw materials was a core determinant (alongside military power) in the development of particular geographical regions (see Pred, 1964), such as the Mediterranean (Braudel, 1975), or the northeast region of the United States (Voskuil, 1942). Although the mobility of people, animals, vehicles and goods constituted the very notion of such relatively localised geographical regions, the international dimension of trading patterns was also markedly evident in the early modern period. This was most clearly the case with the development of overland and maritime trade routes that linked trade centres with distant markets. According to Parker (2010:69) it was in the period spanning the 1400s to the 1700s that the global dimensions of trade developed. These interconnections included the exchange of manufactured goods such as muskets from Europe to America and the African continent, alongside the flows of foodstuffs such as potatoes from South America to Europe. The interest in the embryonic period of distributive space lies with the material (as well as political) mechanisms developed in order to facilitate movement. On a localised basis one could cite the development of canal networks in seventeenth century France (Mukerji, 2010), the formation of rail networks (Kern, 1998; Schivelbusch, 1986), or surface technologies such as asphalt,

which improved the conditions of roads (Schnapp, 2003). Similarly, on a wider scale, whilst the networked nature of international trade geographies of this period was not as pronounced as the continuously networked flows that we see today (Parker, 2010:69), there were obvious cases where international markets were integrated through international transportation mechanisms and infrastructure. The development of particular sailing technologies points to the relationship between developments in transportation, trading relations, and political-imperial power. For example, the rise of Portuguese oceanic power in the fifteenth and sixteenth centuries was, in part, dependent on the exploitation of strategic advantage through the development of socio-technical systems such as the design of Portuguese sailing vessels. Law (2003b) notes how the success of the Portuguese trading empire was facilitated by the technically sophisticated sail designs, which were critical for the incorporation of the wind. This, as Law argues, was part of the ability to “extract compliance” (Law, 2003b:5) from the force of the trade winds (also see Parker, 2010:72). We can see then how in these earlier periods the global mobilities of raw materials and finished commodities comprised an important factor of incipient capitalist trading networks. Equally, there is also evidence to highlight the important communicative role played by sailing vessels and other forms of transport technology in distributing political, cultural and commercial power. Law’s argument also highlights the strategic importance of controlling the spaces of distribution, through the power of specific port cities, but also through the connective power of ships. For as Gilroy states, ships “were mobile elements that stood for the shifting spaces *in between* the fixed spaces that they connected” (Gilroy, 1993:16-17). From this we can appreciate that in the early modern period the distributive space of commodity mobilities was a central facet of commercial, and thus military-political power. However, whilst the connective power of socio-technical systems such as sailing vessels clearly attests to the importance of oceanic space in this earlier period, it is with interconnected and interdependent

qualities of globalisation that the ‘continuous network’ of distributive space becomes evermore apparent.

As Castells’ work identifies, the spatiality of contemporary capital is driven by the changing economic parameters of capital mobility. Whilst the metaphor of flow points to a set of processes which posit the inherent mobility of capital this has to be set against wider economic, social, cultural and political shifts, most clearly with globalisation. Given the function of this overall section to identify the ‘place’ of distribution, there is a limit to the wider implications of globalisation, including its impact on geopolitics, or culture (see Appadurai, 1996). However, we do need to locate some of the significant structural changes at the political, economic and spatial registers (Amin, 2002; Sassen, 2000), especially in relation to earlier trade geographies. Although this is much debated, in overall terms globalising processes can be said to have established a series of shifts, including:

- The move from a world economy of integration across national territories toward global circuits of integration
- The dominance of transnational capital where every country is integrated into a “global production and financial system” (Robinson, 2010:290)
- Growth of information, communication, and transportation technologies
- Shifts in the traditional manufacturing bases from centre to periphery (Dicken, 2011:14)
- Flexible manufacturing processes
- ‘Flexible’ approaches to labour i.e., loss of organised and unionised labour (Macdonald, 1991:191), with growing precariousness in terms of job security (Joseph, 2005; Virno, 2004)
- Development of a global class elite (see Castells, 1996:415-7)
- Rising power of transnational political and economic systems, which have delinked from state power
- New forms of insecurity, domination, and inequality.

This admittedly simplified list of the changes that have taken place under the moniker of globalisation, points to a number of key issues that begin to highlight the growing importance of distributive space, and the wider role of mobility. This can be seen through the rise in commercial air traffic (Urry, 2000:63-64), or with debates on migration (Papastergiadis, 2000). However, in the context of commodity culture the

move toward flexibility, in manufacturing processes in particular, underscores the interconnectivity of economic systems. It also points to the resultant structural fallibility of such interdependency, illustrated by the 2008 global collapse (Robinson, 2010). The intention here is to establish the link between the spatio-temporality of globalisation in relation to the shifting patterns of production, and by definition the effect on distribution and consumption. As will be outlined more fully in *Chapter One*, containerisation has played a highly significant part in this system of global interconnectivity.

Overarchingly we see a move from centralised forms of production processes under the wider auspice of Fordist mass-production technologies in core countries, where “71 per cent of world manufacturing production was concentrated in just four countries and almost 90 per cent in only 11 countries” (Dicken, 2011:14), toward the decentralisation of production and the increasing manufacturing power of previously peripheral economies (Dicken, 2011:30-31; Hardt & Negri, 2000:294). The global shifts that have taken place are determined by a range of factors, including the shift away from the core-periphery model; the geopolitical aftershock of World War II where the manufacturing capacities of core countries other than the US were destroyed; the development of new industrial, communication and transportation technologies; rising instability of the world economy; and “the growing interconnectedness between different parts of the world” (Dicken, 2011:16). The key factor for Dicken is the growth of transnational corporations (TNCs) and their power to influence the role of the nation-state and governments through integrated trade, investment, and macro-economic policy.⁴ Such company formations are inherently distributed on a global level, where they have the means to organise and control the operations of various sub-companies throughout the world. The power of TNCs lies in their flexibility on two levels. Firstly,

⁴ Whilst Dicken focuses on transnational corporations he acknowledges that the impact of such organisations varies according to particular sectors and countries, as well as the scale of specific TNCs.

their adaptability towards access to natural resources and raw materials, labour markets, capital, and state subsidies. Secondly, through their “geographical flexibility” (Dicken, 2011:61) TNCs can shift resources and operations according to demand at national, international and global levels. Once again, the twinned notions of flexibility and interconnectivity are clear.

TNCs have also played a significant role in the rise of global production networks (GPNs), where there is a “circuit of interconnected functions, operations and transactions through which a specific commodity, good or service is produced, distributed and consumed” (Dicken, 2011:56; also see Coe, Dicken & Hess, 2008; Macdonald, 1991:183). The networked nature of such production mechanisms has an important bearing on the discussion of distributive space. The power of TNCs is dependent on their ability to seek out the most competitive markets for manufacture, as well as the outsourcing of certain company functions. These factors begin to identify the complex geographies of global production networks. Whilst a variety of production models continue to exist, including Fordist forms of mass-production, for our purposes, one model in particular is significant: “transnational vertical integration” (Dicken, 2011:140). In this model “materials, semi-finished products, components and finished products are transported between geographically dispersed production units in a highly complex web of flows” (Dicken, 2011:142). Crucially, the distributed nature of production facilities places a much greater emphasis on two key factors: the importance of communication and transportation.

The effects of such changes are significant in terms of how we conceptualise interconnected qualities of production and distribution. In particular, as briefly mentioned above, the outsourcing—or what Marazzi (2008:41) calls the “externalization”—of company functions has an important bearing on the shifting geographies of production. In effect, outsourcing delegates aspects of a firm’s function to

another firm. Primarily this is the case when the external company has greater capability in producing a specific good or service (often more cheaply), thus leaving the main company to concentrate on their core capabilities. In geographical terms, whilst outsourcing practices were initially contained within relatively close proximity, advancements in communication and transport technologies have facilitated the use of outsourced suppliers from across the globe (Dicken, 2011:146; Robinson, 2011:290). An important factor in this type of production-supplier relationship is flexibility. In the post-Fordist economy of outsourced, flexible production the geographical extension of networked interconnectivity clearly has a significant relationship with geographical space and location, but a fundamental issue is also that of time (Schoenberger, 1994; 2000).

Whilst temporality was an important factor in Fordist ideology, most notably with the legacy of Taylorist scientific management practices, in post-Fordism the distributed nature of production and supply networks resulted in “an obsessive concern with reducing the time in which goods are tied up unproductively either in inventory or waiting around for further processing” (Schoenberger, 2000:324). This applied both to the operations of industrial machinery,⁵ and to the wider mobility of components and parts in the manufacturing process. The technological and organisational platform most obviously associated with these spatio-temporal concerns was that of the just-in-time system (JIT). As the name suggests, the critical factor with JIT was the ability to mobilise components to provide them as and when required. This stood in contrast to the just-in-case (JIC) model associated with Fordism, where large stock inventories were held in order to provide a reliable supply of components. With such inventory-heavy procedures stock was buffered in order to meet demand i.e., demand was forecast. The ‘lean’

⁵ Under the Fordist system both workers and machinery were allocated specific tasks. The flexible approach to both labour and equipment meant that both worker and machine were expected to perform multiple functions (Gertler, 1988:420; also see Tomaney, 1994:165). In the case of the worker, whilst it may appear that multiple tasks would alleviate the inherent monotony of single-task operations, it is clear that the underlying ideological premise was to extract more labour from a reduced size of workforce (Virno, 2004:104).

production methods associated with JIT were first developed in the automobile industry, notably with Toyota in Japan, where the 'kanban' system, as it was known, was pioneered (Aoki, 1988; Womack, Jones & Roos, 2007). In the JIT system, rather than inventory being stockpiled in large warehouses and lying in apparent suspended animation, 'leanness' emphasised the need to be able to mobilise supply resources as quickly as possible. JIT is based on current rather than forecasted demand, so there is less emphasis on stockpiling of inventory; instead there is the issue of meeting this demand at short notice. The key to such processes was the ability to keep the process *flowing*, so that "parts and subassemblies must be transported to the producer/assembler relatively quickly and on short notice in order not to disrupt the flow of the production system within the assembly plant" (Gertler, 1988:422). Indeed, the flow metaphor is a strong spatio-temporal metaphor in the JIT system. Aoki (1988:13) describes the manufacturing process as "river-like", where the mouth of the river is the entrance to the market, and the processes prior to entrance to market are seen as the tributaries of the main flow of the river. So, for Schoenberger (1994:57-58) there is a "necessity to compress drastically the time it takes to move a product through the cycle from design and development to scaled-up manufacturing".

Whilst the discussions above are an inevitable simplification of inherently complex manufacturing processes the aim of this outline has been to emphasise the shifting terrain of post-Fordist production processes, and their attendant impact on how we might conceptualise distributive space. We can begin to garner the critical importance of flexible approaches to manufacturing, in relation to the scale of production; the change in focus to transnational corporations whose networked structure externalises key roles through processes such as outsourcing; from this we see the decentralisation of production to traditionally 'peripheral' economies; and there is a growing emphasis on the movement of components, raw materials and finished products. In particular, the

efficient movement of components, spare parts, semi-finished and finished products has emphasised the importance of temporality when compared with Fordist production practices, but more fundamentally for the present argument, it exemplifies the fundamental role of the *distribution* of all these constituent factors. In this case, we can begin to position distribution as a space-time that creates “links between producers and other producers who supply inputs to their production process, as well as links between producers and the final consumer market” (Gertler, 1988:420). Although there is an inevitable rhetoric of ease that pervades some these metaphors, such as flexibility, leanness, adaptability and interconnectivity, there are of course parallel mechanisms developed to construct such apparent flexibility. Indeed, although the metaphor of flexibility is powerful, the linkages must be “strong and formalized” (Gertler, 1988:422). As intimated above, two fundamental generators of post-Fordist flexibility have been transport and communication, or what Dicken terms “circulation technologies” (2011:81). Although Dicken goes onto argue that such circulation technologies did not *create* global economic forces, he makes the case that they are central to their power. And as such we can begin to posit the power of circulation to the forces of globalisation. There is an important historical precedent in Marx’s analysis of the burgeoning capitalist economies of the nineteenth century. By addressing the question of circulation Marx also presciently foretold the critical importance of communication and transport to commodity flows, an area of his work that remains somewhat under-conceptualised (but see de la Haye, 1980).

The Legacy of ‘Circulation’ in Marx:

Unsurprisingly, Marx’s work on the relationship between capitalist modes of production, the circulation of capital and labour, and the consumption of commodities, offers a rich and highly complex picture. There are, however, distinctions to be drawn between the

various terminologies developed in Marx's work, particularly in the *Grundrisse* (Marx, 1993; also see Sayre, 2008). Given the concentration on distributive space in this thesis it is imperative to note Marx's use of the term *distribution*. Firstly we need to situate it within the wider spectrum of production and consumption. There are essentially four 'moments' in Marx's reading of the capitalist commodity: those of production, distribution, exchange and consumption (Marx, 1993:88-89). For Marx distribution refers to how individuals are able to participate in the commodity; that is, through the distribution of wealth, as well as the allocation of "ground rent, wages, interest and profit" (Marx, 1993:95). But further to this, distribution is said to be a central facet in the "the distribution of the instruments of production" (Marx, 1993:96), where the distribution of wealth is a determining factor in the structure of production itself and wider sets of social relations. Exchange is said to deliver "the particular products into which the individual desires to convert the portion which distribution has assigned to him" (Marx, 1993:89). As such, the notion of exchange is locked into the distribution of the ability to consume, and as Marx states, to satisfy "individual needs" (Marx, 1993:89). The idea of satiating desire links, of course, to consumption where Marx locates the concept of gratification (1993:89). Consumption is potentially seen as the closure of the circle or cycle of production.⁶ However, we cannot separate production and consumption: the process of gratification in consumption depends upon the production of material goods (Marx, 1993:92). Marx calls this co-dependency between production and consumption a form of "immediate identity" which I take to emphasise the inherent identification of one in the other:

"One appears as a means for the other, is mediated by the other: this is expressed as their mutual dependence; a movement which relates them to one another, makes them appear indispensable to one another, but still leaves them external to each other" (Marx, 1993:93).

⁶ More recent work on consumer culture (Gregson & Crewe, 2003; Kopytoff, 1986), and particularly aspects of sustainable consumption (McDonough & Braungart, 2002), has clearly challenged this notion of the act of consumption as the end point to this process.

In this sense Marx identifies an ever-repeating cycle of demand. He goes onto add that the act of consumption dissolves the product, i.e., the literal *consuming* of the product itself. As such, consumption is said to create the product's status as product, but is also the point where "the producer becomes producer" (Marx, 1993:93).⁷ There is then an inherent movement or *mobility* in the accumulation of capital through the commodification process (see Harvey, 1984:373-411). On the one hand the actual physical movement of commodities is not necessarily implied through the circuit of capital. Marx (1980b:161) provides us with two examples of this: with the selling of a house, the transaction from the seller to buyer is inherently about movement, in that the house is mobilised as capital, without shifting location. Secondly, in the context of commodities such as pig iron or cotton, the material can remain in place at a storage facility whilst it is purchased and then resold numerous times by commodity speculators. Its ownership shifts although the product does not. On the other hand, the physical movement of labour as well as commodities is inherent to the production of capital. Marx calls this "a change of location of products", where there is "real motion from one place to another" (Marx, 1980b:161). This idea of commodity mobility has a direct bearing on the use of the term distribution in this thesis, as compared to its usage in Marx.

Above all, the notion of distributive space developed here more readily aligns with Marx's use of the term *circulation*. He has argued that production represents the initial trajectory of the commodity, consumption its conclusion, with distribution and exchange the mid-point in this relationship (Marx, 1993:89). The key factor in this is the movement between each of these interlinked phases. And this is most clearly where

⁷ In this sense we could see the role of consumption as part of a wider *transformative* process. For example, Marx describes how the retailer gives the product a "form for consumption" (Marx, 1993:635) through weighing, wrapping and packaging it. From this we can see how Lefebvre's earlier discussion of the 'mysteries' of the product must be engaged.

circulation comes into play. Circulation is inherently concerned with mobility, both in Marx's work and beyond (see Hughes, 2005; 2006; 2007), and Marx situates the modes of circulation both in the context of the turnover of money (Marx, 1993:186), and, perhaps more significantly for the chapters to come, with the transport to market of goods, or what is termed the "spatial condition of circulation" (Marx, 1993:533).⁸ With specific regard to Marx's work on transportation, Harvey (2001b:242) argues that circulation has two key facets:

- 1) "The actual physical movement of commodities from point of production to point of consumption"
- 2) The costs related to the temporal aspects of this (i.e., how long products take to get to market), and the "social mediations" formed, including relations between wholesalers, retailers etc.

Inherent to these conditions of circulation is the question of transportation, and thus movement. Although Marx positions the issue of transportation within the rubric of production rather than as a distinct phase, it is evident that the mobility of both raw materials and finished commodities is a significant factor in Marx's theorisation of capitalist space-time. This is concerned with the aspect of bringing the product to market as a distinct "*locational moment*" (Marx, 1993:534 my emphasis). The transport industry is a supplement to production, but it is evident that Marx recognises the specificity of this in terms of a moment in place and time. This issue of the distinct moment of circulation pertains to various scales of transportation within the production process itself, be it the movement of coal from shaft to surface (Marx, 1980c:162), or at the larger-scale global level of transport to market. In fact, Marx goes so far as to state that the consumption process is not possible without the commodity completing the movement "from the sphere of production to that of consumption" (Marx, 1980c:162), thus signalling the importance of transportation and communication within Marx's *weltanschauung* (see de la

⁸ Given this differentiation, we have to be clear, argues Harvey (1984:376), that the mobility of money or commodities as a form of *capital* is distinct from that of the *actual* physical movement of things, be they "products [or] precious metals".

Haye, 1980; Harvey, 1984; 2001b; 2010).⁹ From this perspective we can surmise that mobility is a significant factor in the Marxian reading of commodity culture, most clearly communicated by the following:

“The circulation, i.e., the actual locomotion of commodities in space, resolves itself into the transport of commodities. The transport industry forms on the one hand an independent branch of production and thus a separate sphere of investment of productive capital. On the other hand its distinguishing feature is that it appears as a continuation of a process of production *within* the process of circulation and *for* the process of circulation” (Marx, 1980c:163 emphasis in original).

Ultimately then, transportation is situated within the productive realm, but also that of circulation. That this is the case is highlighted by the economic factors surrounding transportation, a critical issue, as we will see in *Chapter One*, in the lead-up to containerisation. The transport to market of finished commodities is bound up in the advancements in transportation technologies themselves, including the development of the railways (Kern, 2003:213-214; Schivelbusch, 1986). As with contemporary global production forces associated with JIT, the critical factor was the issue of speed and its impact on the growth of industrial capitalism, particularly the domination of space (Kern, 2003:115-117; Tomlinson, 2007; Virilio, 2006b). This of course leads us to Marx’s famous dictum regarding the power of time over space:

“Capital by its nature drives beyond every spatial barrier. Thus the creation of the physical conditions of exchange – of the means of communication and transport – the annihilation of space by time – becomes an extraordinary necessity for it” (Marx, 1993:524).

This emphasises the inherent relationship between the economics of movement, and the ability to control and organise spatial relations in order to accelerate such mobilities (Janelle, 1969). Transportation and speed are bound up in the geographies and temporalities of circulation (Virilio, 2006b), most obviously in destroying spatial barriers so to reduce the economic outlays of transportation itself (Harvey, 1984:378-9). Such

⁹ In Negri’s (1991) commentary on Marx’s *Grundrisse*, the role of transportation does not feature.

costs are determined by the development of transport and communication infrastructure designed to reduce geographical distance (Kern, 2003:213; Marx, 1980a) and increase the speed to market, especially distant markets. This was the case not only for the supply of existing trading hubs: for new markets to be developed there must be “improvements in the speed of circulation” (Harvey, 2001b:244; also see Harvey, 1984:377-8). As a result we can appreciate Marx’s reading of circulation (or distribution in my own) as an intrinsic factor in production. The cost outlays in the development of roads, rail, and transport infrastructure more broadly, become a necessary facet of the production of capital. Such an argument clearly locates Harvey’s proposition that “capitalism in general requires perpetual reductions in the cost and time of movement” (Harvey, 1984:378). In particular, the interlinked nature of production and the circulation of capital-as-finished-products, means that the cost of transport systems, as well as their efficiency, has a bearing on production costs.¹⁰ This ultimately leads our discussion to the wider ideology of organising space-time in order to control the speed and efficiency of transportation (Harvey, 2001a:81), as will be discussed more fully in *Part One*.

Thus far, although the specificity of Marx’s discussion of the circulation of commodities and its bearing on the geographies of production may be somewhat denuded by the lapse of time, its prescience with regard to the centrality of mobility of both capital and physical commodities should not be underestimated, particularly with regard to accelerated transportation and communication technologies associated with late capitalism under the auspice of globalisation. Indeed, it could be argued that Marx prefigured the just-in-time ethos of twentieth century production techniques by recognising how reductions in inventory stock levels could increase profit: “the more rapid and uninterrupted the supply of material and *matières instrumentales*, the smaller a

¹⁰ Hence why we see an emphasis in contemporary distributive space on the importance of supply chain geographies, which will be discussed more fully in *Chapter Two*.

supply does the capitalist need to buy” (Marx, 1980b:153). We can see how Marx’s approach clearly articulates the critical importance of circulation, but perhaps one of its drawbacks is that by locating circulation—and transport in particular—within the nexus of production, the discreet, specific qualities of circulation are not fully unpacked. Mann offers a similar criticism to my own, stating that a Marxist position privileges relations of production over those of exchange, distribution, circulation and consumption (Mann, 1986b:24-25). His argument presages more recent work on the notion of the circuits of commodity culture, by arguing that the socio-spatial formation of these circuits is *emergent*: actions in the circulation and exchange phases can affect the sphere of production, rather than a linear causality of one stage following another, with production as the origin. Although this is recognised by Marx, the difference lies in both my own, and Mann’s, insistence on not privileging “the primacy of production over the other spheres” (Mann, 1986b:25, n.2). Effectively, it is clear that Marx recognised the power of transportation to determine relations of production, including the specific locations of production facilities. We turn now to the work of more recent scholars on the *interlinked* nature of production-distribution-consumption.

Locating the Space of Distribution in Production-Consumption:

This work has addressed the interrelations between production, the circulation or distribution of commodities, and their consumption: or what we might call the ‘continuous network’ of commodity culture. This literature (broadly identified as commodity chains geography (Hughes & Reimer, 2004)) has sought to de-prioritise the sites of production and demonstrate greater awareness of the interconnections between production, distribution and consumption. Whilst there have been significant discussions of the relationships between the various nodes in the geography of commodity capitalism (Crewe, 2003; Hudson, 2005; Hughes, 2005; 2006; 2007; Hughes & Reimer, 2004;

Jackson, 1999; 2002; Leslie & Reimer, 1999; Mansvelt, 2005), it is important to situate these in order to more fully build the argument concerning distributive space.

Whilst Dicken's (2011) work in particular speaks to the relationship between globalisation and the spatiality of commodity chains or circuits, Barrett, Browne and Ilberg (2004:21) suggest that a useful means of conceptualising these approaches is to identify vertical and horizontal approaches to the relationships between production, distribution and consumption.¹¹ The former attest to the linkages across a variety of commodity forms, whilst the latter places greater emphasis on the complexities of locale, identity, gender, class etc., across these various points of interconnection. Above all, work in this area of commodity chains addresses the *interconnected* qualities of commodity mobility, stressing the need to bring "together the analysis of different sites, including production, distribution, retailing, design, advertising, marketing and final consumption" (Leslie & Reimer, 1999:402). These approaches move the debate toward an appreciation of how certain cultural manifestations such as identity politics have a bearing on how we might conceptualise the geographies of production, whilst at the same time we can appreciate how the social conditions of labour relations traditionally associated with production can be negotiated in relation to service industries.

These interconnections are intended to reflect three key areas of investigation into the links between production, distribution and consumption: firstly, we can identify the global commodity chains, or systems of provision approach; secondly, the work framed around commodity circuits; and finally, that of commodity networks. The global commodity chains (GCC) method is most clearly associated with world systems theory (Gereffi & Korzeniewicz, 1994). Given this there is a critical appreciation of the *globalised*

¹¹ On similar debates in design theory see Walker (1989; also see Lees-Maffei, 2009; Walker & Chaplin, 1997). Within design studies the focus on the distributive phase has shifted somewhat. In particular, design journals in the 1960s, such as *Design* (the official journal of the Council of Industrial Design (now the Design Council)), carried features on the design of new crane technologies, and new transportation systems (see Gunston, 1968; No Author, 1968; No Author, 1970).

nature of commodity culture, with emphasis placed on the feedback between geographical cores and peripheries, the former traditionally associated with sites of consumption, the latter with production (Gereffi, 1994; 2001), although as we saw in the earlier section on global production networks this is less the case. The mobility of individual (often industrial) commodities is a central facet of this approach (Leslie & Reimer, 1999:402; Raikes, Jensen & Ponte, 2000), and the conceptualisation of the 'chain' helps to situate specific sites *along* the chain of commodity movements from sites of production to consumption. As a result there is much stronger regard for the commodity chain as a whole. Although GCC offers greater appreciation of the interrelated nature of production, distribution and consumption there have been numerous critiques of this as a method, particularly the overtly linear basis of the chain, both as a spatial metaphor, but also in terms of the lack of complexity when compared with non-linear analyses (see Hughes & Reimer, 2004:3; Leslie & Reimer, 1999).¹² Murdoch and Miele (2004:106) go so far as to suggest that GCC conforms "to a simplified set of industrial rationalities". It is also evident that although there is greater awareness of the totality of the commodity chain, the modes of production are still privileged (Leslie and Reimer, 1999:404; Mansvelt, 2005:108).

The issue of the lack of complexity aimed at GCC and its associated approaches, has to a certain extent, been redressed through the cultural lens of the commodity *circuits* approach (see Cook & Crang, 1996; Crang, 1996; Jackson, 1999). This critiques the verticality of GCC and emphasises the importance of horizontal factors such as gender, class, agency, sexuality and identity (du Gay et al., 1997). It also recognises the legacy of work in cultural geography, anthropology, and material culture studies in particular,

¹² There are two extensions of these debates to note. Firstly, that of the *filière* approach, where the trajectory of the commodity from its raw material state to finished object is read through interlinked stages and sites of production and storage. The second, the 'systems of provision' approach, is said to embrace a greater sense of the relationship between production and consumption, with acknowledgement of the cultural value of consumption. That said, this latter field is still criticised for its prioritisation of production (see Hughes & Reimer, 2004:2-3).

where the role of circulation is a central concern (Appadurai, 1986:3). This differs from the Marxian notion, not so much in terms of the exchange process—which Appadurai sees as central to the lives of commodities—but more readily through the social *lives* of commodities (Kopytoff, 1986; McCracken, 1990). In their anthropomorphised state commodities circulate, not only through movement, but also in meaning. And such meanings are paths along which meaning is continually shifting. In their seminal study of the Sony Walkman, du Gay et al. developed the “circuit of culture” (1997:3-4), which was constituted by five processes:

- Representation
- Identity
- Production
- Consumption
- Regulation

Each of these processes needs to be engaged in order to provide an adequate critical analysis of any artefact. For my own argument, the role of regulation is an important one, as du Gay et al. (1997:3) suggest that one must address the “mechanisms [that] regulate its [the Walkman] distribution and use”. So by utilising the spatial metaphor of the ‘circuit’ the circuitous nature of social and cultural inflections throughout the cycle of commodity culture is accentuated. For example, in the cultural studies and commodity circuits literature there is a much more expansive appreciation of the numerous sites and practices where commodity culture emerges, including advertising, the domestic realm, the media, the street, but also, as I want to suggest here, with the sites and meaning of distribution (also see Cook, 2006; Cook and Harrison, 2007).

As such, there is a clear relationship with the conceptualisations of spatiality emanating from *network* approaches (Dicken, et al., 2001). Although the wider complexities of relational networks will be outlined in much greater detail in *Part Two* of the thesis, in the context of situating distributive space, the network is a valuable conceptual apparatus.

“Instead of the simplified world of capitalist ordering, we here encounter complex arrangements that comprise multiple rationalities, ordered in a variety of ways according to mixtures of entities assembled within the networks” (Murdoch & Miele, 2004:107).

So, the complexities of the network are more attuned to the entanglements across space and time. The strength of this lies in the capacity to envision more tangled relationships between the troika of production-distribution-consumption, but also in the recognition that these are localised at specific sites. The attendant legacy of Actor Network Theory is clearly visible in this work, and as a result the networks that produce temporary forms of stability as well as instability are addressed (Cf. Hartwick, 2000).¹³ Equally, the actor network approach resituates the subject-centred concentration of GCC and recognises the critical role played by non-human actors in the relationship between production, distribution and consumption, leading to the situation where

“network-inspired analyses recognize that relations between producers, distributors and consumers are the product of complex flows between hosts of interconnected actors that have become enrolled in the network” (Hughes & Reimer, 2004:5)

¹³ Hartwick’s vehement attack on ANT is framed around a similarly strong defence of the commodity chain approach (2000:1183). She describes the approach as a device to reveal the political dimensions of each of the nodes, whilst providing consumers with knowledge of the implications of their consumption practices.

The Connectivity of Distributive Space:

“We set in motion a series of connections among extraction, production, and distribution, which occurs from one place to another, and each place is transformed by these connections” (Sack, 1997:242)

The literature produced under the various approaches of commodity chains, circuits and networks emphasises the constitutive apparatuses of contemporary commodity mobilities. As we saw at the outset of this section, this is in large part a result of the interconnected, interrelated and integrated aspects of globalisation and its attendant economic, cultural and political processes. Whilst much of this work has noted the need to address the production, distribution and consumption of commodities, Wrigley’s observations on the lack of work on the specific qualities of distribution are telling. He has argued that there has been an underrepresentation of distribution and its economic power, especially in the retail sectors: “the literature which documents and debates globalization and the transformation of the world economy has, in practice, shown a myopic neglect of distribution systems and industries” (Wrigley, 2000:294).

A similar argument is raised by Dicken, where he notes the general unwillingness to recognise the power of distribution, adding that “the *circulation processes* that *connect* together all the different components of the production network are absolutely fundamental” (Dicken, 2011:400 emphasis in original). The spatio-temporal qualities of distribution are central to the processes of globalisation, and in particular it is clear that the shifts in production networks, the power of retail giants such as Walmart (Wrigley, Coe & Currah, 2005), and the rise of consumer-centred demand are dependent on the power of distribution. As Marx’s work presciently foretold, transport and communication play significant roles in the development of late consumer capitalism, notably in terms of the connected mobilities of information, capital, ideas and commodities. In arguing for

the need to consider the importance of distributive space, my intention is to follow Dicken, and particularly Mike Crang's assertion that, in the context of mobility studies, it is imperative to "examine how mobility is produced through *specific spaces*" (Crang, 2002:569, my emphasis). Perhaps echoing Marx's point concerning 'locational moments', doing so will provide an appreciation of the power of these spaces and moments, whilst examining the particular apparatuses of organisation and connection. Although by no means denying the interconnected nature of commodity mobility networks, addressing distributive space in particular may facilitate greater recognition of how commodity mobilities are actioned and mobilised at specific sites and locational moments, as well as the various technological apparatuses that produce this. Whilst not wishing to construct a straw figure, for there have been attempts to consider the distributive phase or space of such capitalist formations (see Bello, 2008; 2010; Easterling, 1999a; 1999b; 2005), by analysing this specific space the intention is to echo Mansvelt's contention that "more insight is needed into the consequences of *particular power geometries* for transforming existing social relations between actors, actants, things and places" (2005:124, my emphasis).

My overarching contention then is that distributive space plays a critical role in the geometries of commodity mobilities through the connective logic that it embodies. Whilst the realms of production and consumption are clearly spaces of connection in their own right, the 'location' of distribution *between* production and consumption highlights the overtly connective function of this space. As will be discussed in later chapters this has important bearings on a variety of levels, including the specific qualities of the sites of distribution, be they inland distribution terminals, warehouses, storage facilities, container ports, road and rail networks, as well as oceanic shipping lanes. It also resonates with the wider organisational culture of logistics management. Further to this, we have already seen how Marx's work on circulation recognised the connective power

of transport and communication, notably how transport was central to throwing “the finished product into circulation” (Marx, 1993:525). This is also inherent to this project: how the space of distribution as the connective link between the commodity chains of global capital is constituted by a variety of transportation technologies, or what Beaverstock calls “enabling technologies” (2008:119). Effectively, the question of enablement is central to the mobilisation or ‘powering-up’ of mobility, in terms of how certain technologies enable movement through the forces of contemporary capitalist spatialities. Echoing Thrift’s observations that logistics involves “thinking about *linkages* and how to make them as efficient as possible” (Thrift, 2004a:589 my emphasis), distribution’s ‘meso’ position between production and consumption, at least in terms of its diagrammatic location, highlights its central function in putting into orbit resources, information, and finished commodities. For the present section, the critical factor lies with the notions of connectivity and points of linkage, including the power of the enabling technologies of transport and communication.

By aligning distributive space with connectivity my intention is to posit how the flows between realms of production and consumption are mobilised. As the main chapters of the thesis will explore, the geographies of connectivity are concerned both with the transformational power to mobilise objects, goods, peoples, ideas etc., but also their inherent complexity. This particular aspect is a central conceptual focus for this project. The complexity of such spatio-temporal relations will be more fully unpacked in *Part Two* of the thesis, however, in the present context it is important to situate the discussion of distributive space’s connective qualities in a wider framework of encounter. In particular, work emanating out of the Actor Network Theory, and Science, Technology, and Society discourses has addressed forms of connectivity as inherently complex and heterogeneous. Callon and Law (2004) have dealt with the issue of connection in terms of network formations, arguing that the connectivity embodied in

networked relations is far from stable. Added to this, like Sack, they also discuss how connections are transformative: that is, they instigate a change or movement in location (Callon & Law, 2004:4; also see Debray, 2000:27). The movement of commodities is mobilised through the power of connectivity to produce circulation. Again, we can appreciate Mansvelt's call for the need to analyse the specific power geometries that facilitate movement and maintain it: be it information, commodities, people, or indeed viruses, and smuggled goods.

On a more grounded note, the links he makes between communication and transportation emphasise how interlinked these two forms of distributive space are. The hybridisation of transport and communication (see Urry, 2004) is an important factor in the constitution of contemporary distributive space. An 'illustration' of this space is shown in Figure 1, where we see the connective forces of global distribution at work. This is a space of complex connections, where a container ship moves gracefully through the air alongside flows of parcels, gold bullion, gas cylinders, people, security vehicles, rubbish bins etc. In this advertisement for BT the relationship between the networked flows of physical objects and the immaterial *organisation* of information technologies is postulated, all mediated under the auspices of a telecommunications company. Given the context of the medium it is unsurprising that the complexity of organising such flows is underplayed. Their movement appears frictionless. Despite the apparent ease of mobilisation this image helps us to imagine the richness of distributive flows. It raises the question of how to envision or *conceptualise* distributive space. Do we see this as a stable entity where the connective power to mobilise flows occurs with predetermined certainty, apparently frictionless, or as a space of connective relations that are inherently aporetic in their teetering vacillation between stability and instability? As alluded to above the stance developed in this thesis emanates from more social and cultural perspectives, notably mobility studies, and as a result it is the latter that provides the conceptual armature. In

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BT 
More power to you

Figure 1: BT advertisement, 'This is the digital networked economy. Where business is done' (2005).

doing so the intention is to highlight the value of existing approaches to the physical distribution of commodities, including the profound shifts instituted by globalisation, and particularly the role of transportation (Dicken, 2011:81), whilst building on these by recognising the importance of distributive space by employing a variety of tropes from other discourses.

As already noted above, although the likes of Wrigley have identified the paucity of discussion on distribution, where this has taken place, notably in economic, and transport geography, these disciplinary stances have their limitations.¹⁴ Perhaps the most significant implications of the work on physical distribution and transportation have been the *quantitative* approaches to the spatio-temporal organisation of movement studied in transport geography (Sparks, 1986; Krugman, 1993:103; McKinnon, 1985). To this end we will conclude this introductory positioning of distributive space by considering the role of transportation in terms of the developments offered by Thrift's work on 'movement-space', the discourses associated with mobility studies, as well as the attendant legacy of transport geography. As discussed at the outset of this section, one of the most productive analyses of these issues is Thrift's work on movement-space (Thrift, 2004a). Here, and in other investigations (Thrift, 2004b; 2006a; 2012), he has outlined the increasing spatio-temporal complexity created by the seemingly "mundane frameworks" (Thrift, 2004a:583) of contemporary life, as well the mutations in connection seen with advancing technologies (Thrift, 2006a:281). The idea of movement-space is premised on the manifold background practices (such as infrastructure, computation, calculation) that 'power-up' movement. This is likewise the case for this thesis: but it also attempts to posit the genealogical trajectories that have led to the more recent transformations described by Thrift. My intentions then are perhaps a little less engaged with the transformative power of developing technologies and more inscribed in the brute materialities of certain transport mechanisms such as the design of the container corner fittings discussed in *Chapter One*. That said the technological capacities of infrastructural power are central to the arguments developed herewith.

¹⁴ Even in transport geography itself, whilst there has been a noted focus on global production networks, Hesse and Rodrigue (2004) point out that a surprising lack of attention has been paid to the physical movement of commodities and freight distribution.

Overall, Thrift argues that the modes of putting objects, people, ideas etc., into circulation are through vast networks of interaction between space-time and the actors that constitute this. His identification of how these spaces of movement and flow are mobilised by “artificial paratextual forces” (Thrift, 2004a:583) is decisive. Such forces are those hidden, unperceivable entities that operate behind the scenes: they remain unseen, and unheard, as they become normalised over time. Crucially, such “invisible forms [...] constitute the bare bones of the world, [...] especially on structures of repetition” (Thrift, 2004a:583), the latter of which will prove significant to the discussions in *Chapters One* and *Two* on standardisation. Consider the presence of roads, lighting, pipes, Thrift suggests: these are paratextual entities that remain invisible through their utter ubiquity. It is precisely these unseen qualities of the paratextual armature that makes it so powerful in determining movement-space. For my own purposes in this thesis, this argument is fundamental. Returning once again to the opening quotes in this section we can see the correspondence between the invisible paratextual forces that constitute movement-space, and the ‘magical’ qualities of the appearance of commodities in retail spaces. Whilst the paratextual forces of material infrastructure, such as roads, vehicular transport, pipes, cabling etc., are, for Thrift, the first wave of movement-space, the second-wave is constituted by the more recent artificial forms of software, wireless signals, radio frequency identification (RFID) technologies, and code-space more broadly (see Bratton, 2006; Dodge & Kitchin, 2004). In this second-wave of paratextual forces things are mobilised by being ‘positioned’ via the technology of computation, thus

“producing a tightly constrained and ordered world of calculation in which potentially every thing and every location (the two becoming interchangeable) could be given number and become the subject of calculation, and in which each calculation could potentially be redone several times a minute” (Thrift, 2004a:590).

Such a system of control, produced via ‘qualculation’ (i.e., the qualitative as opposed to quantitative nature of calculation), is there to enhance the speed and efficiency of

movement-space bringing together object and space in a process of constant locatability. In such a situation we see that movement-space problematises the notion of position *per se*: for position becomes location, but more profoundly locatability is the means to constantly account for position as an ordering of movement. Although movement-space relates to a range of other aspects that will be dealt with in *Part One* of this thesis, we will briefly remain with paratextual forces, for although the second-wave clearly articulates the growing power of logistics over and above the traditional conceptions of physical distribution (again, this will be developed more fully in *Chapter Two*), the first wave of distributive space still holds a great deal of analytical potential, especially in light of the notion of “space-adjusting technologies”, as developed by Janelle and Beuthe (1997:200). This idea implies the control of spatial mobilities through the macro and micro organisational forces of transportation, communication, infrastructure, energy, and labour.

As we have seen earlier in this section the connective logic of capitalist space-time was clearly understood by Marx as partly being defined by the role of transportation technologies in mobilising the power of demand creation. In part this may account for what has traditionally been the key function of transport geography: “the need to figure out how to efficiently get from A to B” (Cresswell, 2010a:554). Whilst this clearly relates to Thrift’s ideas on calculative locatability, Cresswell’s observation provides a critically minded assertion of the link between transport geography and the production of efficiency. Textbooks such as *The Geography of Transport Systems* (Rodrigue, Comtois & Slack, 2006) attempt to link transportation and mobility, but quickly retrench the arguments on transport geography by stating, “a driving force of the global economy resides in the capacity of transport systems to ship large quantities of freight and to accommodate vast numbers of passengers” (Rodrigue, Comtois & Slack, 2006:viii; also see Janelle & Beuthe, 1997:206). Further still, Marx’s dictum on the annihilation of space

(although from competing critical-political standpoints) is echoed when the purpose of transportation is identified as the means to overcome space, and in particular the barriers or friction of distance, time, topography etc., (see Hesse & Rodrigue, 2006). It is recognised that friction cannot be fully circumscribed, but the implication is that the reduction in friction is a crucial facet of the geography of transport systems. We see a similar set of ideological premises in an array of the literature on transport systems, where, for example, the utility of location is promoted as an economic value (Janelle, 1969; Leinbach, 1976; Rodrigue, 2004). Such earlier conceptions of the functional role of transportation systems in transport geography have been critiqued from within the discipline (Goetz, Vowles & Tierney, 2009; Hanson, 2003; Hesse & Rodrigue, 2006; Keeling, 2007), where it has been asked whether transport geographers are “stuck in the narrow confines of network structures and flows, unable to explicate the multiple ways that transportation shapes human activity across the globe?” (Keeling, 2007:218). Whilst Hanson (2003) in particular has been strenuous in critiquing the lack of theoretical complexity and the overt quantitative bias, Keeling’s (2007:219) answer to the question is that transport geographers need to demonstrate awareness of the relationships between transport, users, accessibility and mobility.

Although it is valuable to consider these disciplinary debates, for the purpose of the present section the intention is to posit the need for an approach that can encompass the scope of Serres’ ‘spatial characters’, whilst being grounded in the theoretical-analytical rigour of Thrift’s rendering of movement-space. And it is with the *seam* between transport and mobility studies that I suggest this potential resides. This is shared by a number of recent explorations of mutual concerns “for the subjects and objects of our transport and mobility systems” (Bissell, Adey & Laurier, 2011:1008; also see Cresswell, 2010a; Shaw & Hesse, 2010; Shaw & Sidaway, 2010). Just as Keeling argues that accessibility is critical to the reframing of transport studies, a similar argument is

developed by Cresswell in his recent identification of six potential conditions of mobility, where he highlights the dynamical foldings between rapidity, mobility, and the politics of access. As he states, “mobility is a resource that is differentially accessed. One person’s speed is another person’s slowness” (Cresswell, 2010b:21). The processes of social stratification through mobility mean that it is clearly a differentiated condition, and this is the case for both corporeal mobilities as well as the mobility of finished commodities, components, and raw materials. Above all then, given the legacy of Marx, it is clear that the issue of transport is bound up with power relations and politics: hence why Shaw & Sidaway (2010:515 emphasis in original) call for “transport geography to be a more *human* geography”. There are those individuals and things for whom globalisation implies an un-tethering of spatial impediment, and those who are denied access to the networked configurations of global mobilities. As Cresswell has recently argued, the ‘new mobilities paradigm’ (Sheller & Urry, 2006) could be read, in effect, as the restatement of historical debates on the movement of people seen in migration theory or the spatial dimensions of trade routes seen in transport geography (Cresswell, 2010b). But he also suggests that there is without doubt a shift in the ontology of movement as a result of technological development, as well as the socio-cultural importance of mobility more generally. One has only to think of the assumed ease of communicating instantaneously at a global level, or travelling without impediment (see Torpey, 2000). Most clearly the accelerated Modernities of the late nineteenth and twentieth centuries resulted in the now infamous notion of time-space compression (Harvey, 1990), or as Giddens commented, the disembedding of the local (Giddens, 1990). However, one needs to adhere to Cresswell’s insistence on the various *constellations* of mobility, that is the “particular patterns of movement, representations of movement, and ways of practicing movement that make sense together” (Cresswell, 2010b:18). Mobility cannot be separated from the various entanglements of how things or people move, the representations of movement (through

the example shown in Figure 1), or indeed the specific strategies and tactics that are practiced or performed in order to facilitate or perhaps curtail movement through the production of stillness (see Martin, 2010). These make mobility political: “they are implicated in the production of power and relations of domination” (Cresswell, 2010b:20). That there are strategic mechanisms to organise the movement of people and things as part of political, religious or economic domination is not revelatory. We saw this in the earlier discussion concerning early Modern trade. The development of sociotechnical systems such as the sailing ship for the purpose of geopolitical domination attests to such an argument (Law, 2003b), as does the formation of the nation-state itself (Giddens, 1987). However, one has to be cognisant, following the idea of such constellations, that the practices of domination are not the sole manifestation of mobilities. The ‘official’ mobilities of commodity distribution, cosmopolitan tourism and vehicular transit cannot be disengaged from the immanent presence of non-sanctioned mobilities. For example, Harris Ali & Keil, in relation to the SARS epidemic of 2002/3, have spoken of the threat posed by the connectivity of global mobilities (Harris Ali & Keil, 2010). Again, this will be considered in *Part Two* of the thesis, however it will also be a constant presence throughout. Instead we need to follow Cresswell’s lead in insisting that mobility is *differentially* produced, distributed and consumed (Cresswell, 2010b:21).

Overall, the nature of this *Contextual Introduction* has been to align the wider notion of distributive space with the debates on globalisation, as well as locating it in a historical framework through Marx’s work. Doing so helps to recognise that distributive space is part of a continuum of circulatory force. By discussing the concept of circulation in Marx’s work my intention was to situate my own rendering of distribution as a significant ‘locational moment’ in the matrix of production and consumption. To this end, more recent literature on the geographies of commodity chains also helped to position

distribution as part of a wider nexus. This work in particular offers a much more nuanced rendering of the interrelationships between production-distribution-consumption. However, as the final section on distribution as a space of connectivity tried to argue, the conceptualisation of distributive space developed here attempts to locate the power of this specific space-time, whilst cognisant of its networked nature. Following the initial outline of approach in the main *Introduction* here in the *Contextual Introduction* I have also endeavoured to further locate the importance of the work in both transport geography, and mobility studies in particular.

Part One

Interlude I:

Spatio-Temporal Orderings

Dividing Order and Disorder?

At the close of the *Contextual Introduction* it was argued that issues of commodity mobilities, and movement more broadly, are determined by geometries of power relations. From Marx we saw the wider ideology of organising space-time in order to control the speed and efficiency of transportation, and thus capital circulation (Harvey, 2001a:81). Thus, the control of movement is concerned with cost reduction (Sparks, 1986:148). Given these points, and others discussed previously, this interlude is intended to focus the debate on the wider conceptualisation of the power geometries of distributive space, and in particular on the modes of stabilisation and ordering designed to facilitate spatial and temporal control. It is also designed to provide an armature around which to discuss the material constitution of the organisational forms of containerisation and infrastructural power in the following two chapters.

The notion of order has long been a central problematic of cultural, social and political theory, from criminological studies of deviance, through the classification of dirt (Douglas, 2007), the ordering of the domestic realm (Cresswell, 2006:120), to the naming of madness as a categorical abnormality (Foucault, 1985; Hacking, 1990). In geographical terms the organisation of the globe through the *nomos* of the earth (Schmitt, 2003) asserted that international law was essentially a spatial ordering of the globe *as a whole* (see Palaver, 1996:110; Sloterdijk, 2009). Equally, in urban geography the question of the orderly city has engaged urban planners and architects, most notably Ebenezer Howard in the nineteenth century, and Le Corbusier in the twentieth (Pile, Brook & Mooney, 1999:3; also see Sennett, 2008b). Both sought to solve the problem of urban disorder through mechanisms designed to improve the conditions of urban dwellers. Whilst such an ethos is admirable in its drive to change the social and built fabric of society, there is a wider implication of assuming that it is possible to actually dissolve the disorderly (Scott, 1998:15). Fundamentally such systems of ordering are concerned with the identification

(and perpetuation) of difference between perceived social norms and abnormalities in order to assert a form of control over the latter. This is part of a larger social, philosophical and aesthetic project that has its legacy in the purported sanctity of order over and above disorder. As John Law states:

“Many of us have learned to want to cleave to an order. This is a modernist dream. In one way or another, we are attached to the idea that if our lives, our organizations, our social theories or our societies, were ‘properly ordered’ then all would be well. And we take it that such ordering is possible, at least some of the time” (Law, 1994:4-5).

In this sense order is framed as a necessary filter for social norms. And perhaps as a result of this there is an assumption (as Law (1994:2) also argues) that there is only one type of singular order, *an* order. This notion of singular order has its roots in the wider Enlightenment project of scientific reason where the idea of a “stable reality” existed (Porter, 1993:87), but also in terms of the monotheistic tradition of the One voice (Law, 1994:7). In secular terms the development of nineteenth and twentieth century social thought also resides within a wider conceptual project of progress (Tilly, 1984:11-12; also see Benjamin, 1992) so that there are successive advancements from one epoch to another, partly as a result of the logic of differentiation. Through such means differences are constructed in order to legitimate one course of action over another, in the case of society Tilly critiques the construction of distinct divisions between social order and social disorder. The former is marked by the ‘social’ itself; integration; satisfaction; legitimate control; progress; and normality. By contrast, disorder accounts for individual intuition; disintegration; strain; violence; decay; and abnormality (Tilly, 1984:12). Above all, it is through the controlled development of social order that ‘society’ is said to progress.

Whilst the implications of such a worldview are important to the wider project of this thesis, and will be developed shortly in the main body of this interlude, it is crucial at this point to elaborate a little further on the conceptual division between order and its

antonymic Other, disorder. The traditions of such a process are obviously lengthy, and manifest themselves in numerous guises, particularly through dualist philosophies of the binary. Politically, for example, such binary approaches to spatial control have been utilised for the purpose of cultural homogenisation in the name of ‘purification’ on the grounds of perceived forms of difference (Sibley, 1988; 1995). This is a fundamental problematic, politically and epistemologically, but for the forthcoming discussions, primarily spatio-materially. Of particular value is Latour’s work on the project of purification: this offers a valuable insight into what he terms the creation of “strong divides” (Latour, 1987b:94). If we look to Figure 2 we can see that these are both conceptual and spatio-material, in the sense that a ‘barrier’ is created where the relationship between order and disorder is constructed. There is an epistemological distance or divide placed between order and disorder, a kind of ‘buffer-zone’ that presents a purified rendering of their distinctness. Similarly, in *We Have Never Been Modern* Latour discusses the relationship between purification and translation (Latour, 1993:11; also see Callon, 1986). Through his now-famous diagram of this constructed divide of purification (see Figure 3) Latour offers us a valuable representation of this, where purification is typified by an attempt to create stability by dividing nature (nonhumans) and culture (humans); whilst translation by contrast testifies to a world of entanglements between nature and culture.¹⁵

As we will shortly see, this notion of division or purification is of fundamental importance to the attempted construction of stable relations in distributive space, both in the organisation of space and time through containerisation, and also in terms of the wider political projects of securitisation (See Graham, 2011). Likewise, within De Certeau’s (1984) work on strategy the notion of isolation is decisive. It infers the ability to

¹⁵ Of course, the inherent weakness of such a diagrammatic representation of purification is that the diagram itself purifies the act of translation or hybridity. Surely the complexity of hybridity cannot be subsumed into a simplistic, zigzagged line?

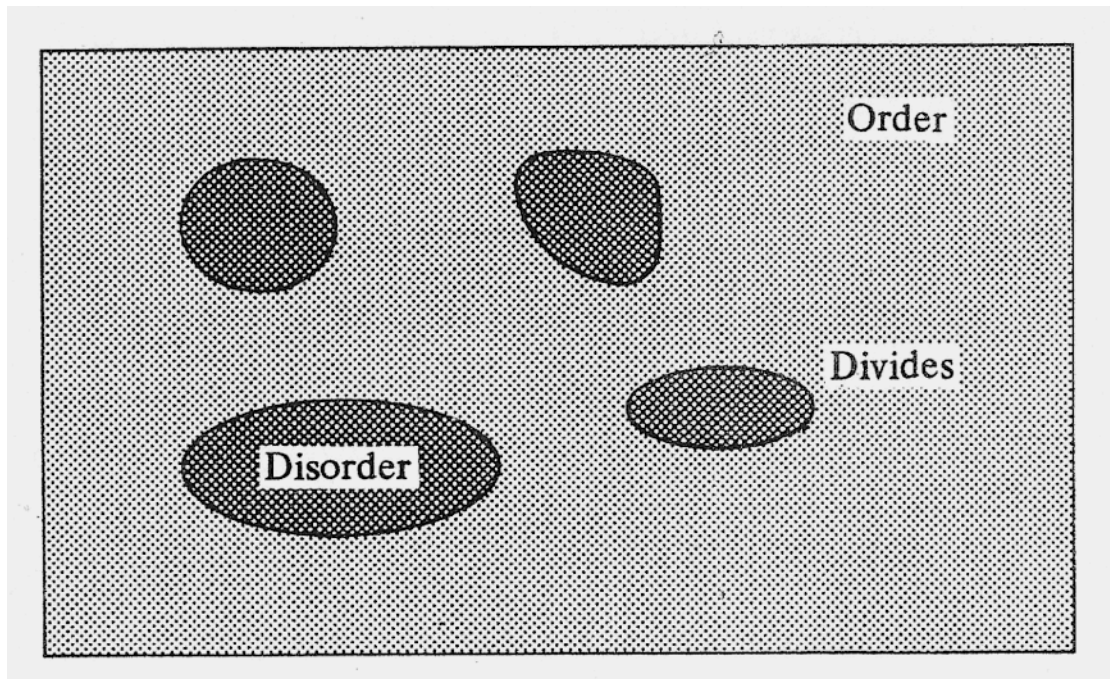


Figure 2: Islands of disorder in a sea of order (with 'divides') (Source: Latour, 1987:94)

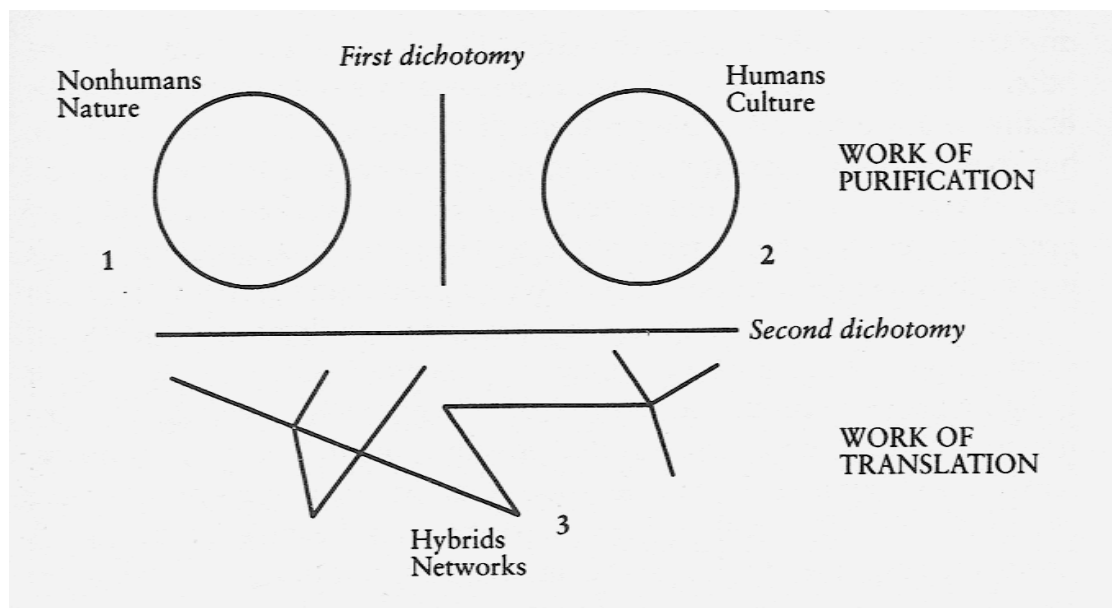


Figure 3: 'Purification and Translation' diagram (Source: Latour, 1993:11)

create a boundary or zone of spatial exclusion around specific entities, facilitating control.

From this we arrive at a definition of strategy as

“a *place* that can be delimited as its *own* and serve as the base from which relations with an *exteriority* composed of targets or threats (customers or competitors, enemies, the country surrounding the city, objectives and objects of research, etc.) can be managed” (De Certeau, 1984:36 emphasis in original).

These concepts of isolation and division are decisively political ones then, in terms of the power geometries of control. Akin to De Certeau, Scott argues that “many state activities aim at transforming the population, space, and nature under their jurisdiction into the closed systems that offer no surprises and that can best be observed and controlled” (Scott, 1998:82). Through this we can garner some critical observations regarding the link between power, order, control, certainty and stability. In particular the nature of a closed system indicates a spatial divide of inside and outside similar to that described by Latour, whereby the actions within the space are delimited through observation and organisation of action, in a panoptical sense (Foucault, 1991). The correlation between making space legible and thus knowable is critical. Equally the underlying tools of control are the stabilisation of the space in order to produce (in theory) a predictable, certain set of outcomes within the domain. Where this is the case for the actions of the nation-state in Scott’s critique of state-based domination, a similar prerogative is at work in the organisation of mobility, be it road networks or architectural forms (Easterling, 1999b; 2004; Graham, 2001).

Out of these various organisational forms the shaping of action is a central factor in the ‘cleaving to order’. The question of ‘shaping’ *per se* is an important one in relation to the politics of organisation, for it implies the organisation or laying-out of a space (as with the road networks of the United States (Easterling, 1999b)), or an object through a regime of action.¹⁶ A useful discourse on the shaping of action is present within the (admittedly rather tangential) field of craft practices, where the woodworker and design writer David Pye developed the notion of ‘shape determining systems’ (Pye, 1964). Such systems refer to forms of mechanical constraint, so that the actions of a component are

¹⁶ Ogborn (1998:171-185) raises an interesting point concerning the shape and design of beer casks and barrels, both in terms of calibrating space, and in the role of collecting excise duty in the 17th Century.

determined by their arrangement within a system of predetermination (Pye offers the example of a bacon-slicing machine (1964:53)). This preceded his later and highly influential conceptualisation of the difference between the ‘workmanship of risk’, and the ‘workmanship of certainty’ (Pye, 1968). The former attests to traditional forms of craft skill, where there is an immanent presence of risk or error in the process of making (also see Sennett, 2008a). Neither the end result nor the process of making is predetermined—value lies in variability. Within the wider craft tradition the inherent risk of such processes is the mark of uniqueness, and ‘authenticity’, although risk is not a prerequisite of quality, and the workmanship of certainty is not necessarily the mark of inferior workmanship. Straightforwardly speaking, the workmanship of certainty differs from that of risk in that the outcome of the process of making is predetermined, most clearly demonstrated by mass-production and total automation technologies (Pye, 1968:20). Although the predetermined outcome and lack of error or variation are the result of rigorous planning, the workmanship of certainty depends on a tremendous amount of risk in the development of the system itself. For example, Pye (1968:21) describes how a typical case of the workmanship of risk would be that of writing, and the workmanship of certainty, the printing press. However, the development of the printing press was dependent upon a process of trial and error before finally arriving at a functioning system. Accordingly, there is an immense amount of background work that goes into the planning stages before the predetermined outcomes can be arrived at. This I term the ‘packaging of certainty’: where the knowledge developed through the workmanship of risk is consolidated into a packaged system, or as we shall see later in the thesis, as a black-boxed package. Similarly, Pye calls this the ‘storing-up’ of knowledge, so that in the case of printing:

“Stored-up capital is drawn on and the newspapers come pouring out in an absolutely predetermined form with no possibility of variation between them by virtue of the exacting work put in beforehand in making and preparing the plant which does the work” (Pye, 1968:21)

This tells us two things. Firstly, and most importantly, it suggests that the predetermined outcome in the workmanship of certainty is the result of lengthy processes of experimentation which become stored-up or packaged. Secondly, there is a slightly disingenuous quality to Pye's allusion to the exactitude of the printing press, for it is clear that printing errors, such as misalignment, are part of the process itself and have to be dealt with on an ongoing basis (see Grafton, 2011). This seemingly minor issue, as well as the first, illustrates a fundamental point: that there is not simply a stable *a priori* order, but rather that of the construction and maintenance of *orderings*.

Pye's work on risk and certainty is markedly close to Law's arguments on 'modes of ordering'. Law critiques the longstanding notion of a singular order and instead identifies multiple modes of ordering. Effectively, rather than a stable sense of *permanent* order, modes of ordering are temporary, and the result of "a lot of work – work that may occasionally be more or less successfully hidden behind an appearance of ordered simplicity" (Law, 1994:5). So whilst there may appear to be a 'stable reality', this is an illusory construct that is maintained for the purpose of an idealised and politicised notion of social order. This is where Law's work offers us an extremely valuable insight into attempts to maintain orderings. In recognising the amount of work that goes into producing such temporary modes of ordering he highlights a fundamental difference between an absolute, stable order and the relative conception of orderings. A key argument in this section then is that control is not a static *a priori* given, rather that it is constructed and maintained through organisational *orderings*.

The first point of focus in the following sections is on the conception of the absolute and classical notions of space, primarily through an emphasis on this as passive. As Harvey (2006:271) asserts, such a conceptualisation of space continues to offer a useful starting

point for understanding space. The controllable nature of space will facilitate later discussions surrounding how logistics as a spatio-temporal practice converges absolute space and relative space-time. In terms of absolute space, whilst we are to deal with specific qualities of the spatial in this chapter we cannot disassociate this from the ideological implications of this worldview. To stress this the work of Prigogine & Stengers (1984) broaches wider social, scientific and philosophical manifestations of the absolute, premised on issues of certainty, fixity and universality. We will see that these ideological barometers do not simply reside in the abstract, they are realised through means of territoriality (see Sack, 1986), as well as the legibility of space (Scott, 1998). Although the notion of the absolute underscores a certain ideological premise of how space and time are viewed, the sense of fixity is at odds to the conditions of circulation and distribution discussed in the previous chapter. Likewise, as the opening discussions in this section have underscored, the sense of a stable order is questioned in relation to temporary modes of ordering. Instead, through a reading of relative space-time the second aspect of this interlude is developed through turning to Harvey's (1996; 2006) discussion of position as the central difference between absolutist and relative conceptions of space-time. I will further this by arguing that the logic of contemporary spatial flows is built upon the role of relative spatio-temporal position. Finally, the conflation of relative position and capitalist space-time is something that will become critical in *Part Two* of the thesis when we consider the potentially 'open-ended' aspects of relational space with its emphasis on space and time as processual.

Absolute Space and Time:

Although the notion of a singular, stable sense of order was rejected in the section above in favour of Law's identification of various modes of ordering, the continued legacy of order (in the singular) still accounts for specific worldviews, for instance in relation to contemporary political-economic turmoil. In this guise the need to *stabilise* the world economy is often compared with the potential catastrophic effects of disorder or turbulence (see Greenspan, 2007). Whilst the complex relationship between turbulence and speculative capital is beyond the remit of this study (see Robinson, 2010), the prevailing language of order is an indication of political amnesia as well as—for the purpose of this section—a telling signal of the apparent surety of a singular order. The purpose of this section then is to consider the relationship between spatial order and forms of certainty and stability. To do so requires a return to some of the wider debates on absolute space, notably through Harvey's (2006) reading of it. Certainty, in spatial as well as philosophical terms, is the crux of the absolute – it is the means to both produce a way of conceiving space in the sense of an 'essence', but also to continue this through mechanisms of prediction and control. In effect, to control and manipulate assumes that matter, space, substance, and time are inert. Given this, the overarching implication of this section is the supposed 'passivity' of space (and time) in the absolutist model.

Absolute space is a space of containment, a framing device for social action. Given the fixed nature of absolute space there is a delimitation of action, a framework or armature that controls, orders and sustains action through a means of imposition. This idea of imposition accounts for the role of mapping and measurement, with Harvey noting that absolute space is "usually represented as a pre-existing and immovable grid amenable to standardized measurement and open to calculation" (Harvey, 2006:272). This is emphasised by spaces such as "states, administrative units, city plans and urban grids" (Harvey, 2006:272). Through such examples we are privy to some of the

paradigmatic qualities of absolute space, namely, the a priori, originary existence of space itself, a space that is not produced in process, but *given* and “content-neutral” (Harvey, 1996:250). It is clear and it is fixed, and thus open to organisation. This passivity toward organisation comes from the assumed ‘static’ nature of this space, an inactive space that is ‘certain’ in the Newtonian conception of the absolute. According to Rescher (1979:84) Newtonian thought “cast space and time in the role of containers existing in their own right, and having a make-up that is altogether indifferent to the things emplaced in them”, a conception of space *and* time that instantiates their separation. However, whilst they may be deemed separate the Newtonian position of absolute time stressed its invariance: “it is infinitely divisible into space-like units, it is measurable in length, it can be expressed as a number and it is reversible” (Urry, 2003:19).

Before developing the specific applications of such absolutist conceptions of space and time further it is necessary to consider the intellectual and philosophical trajectory of the absolute more broadly. Within the debates on the constitution of both the philosophical and geographical absolute it is the Newtonian conception that is perhaps the most significant. Newton’s conception of the absolute is identified by Casey (1998:142) according to five core determinants:

1. Immovability
2. Having no relationship to anything external
3. Remaining always selfsame
4. Not needing any additional or reference system
5. Intelligible as opposed to “sensible”

These considerations provide a clear delineation of the Newtonian world, where space is a neutral, passive, stable container. For the purposes of the present discussion the first, second and third aspects are revealing: they suggest first of all that there is time-independence, in that space does not change. Secondly there is a *non-relationship* between space and the objects that exist within it (a situation that will be overturned in relative and relational space). Thirdly, space—in always remaining selfsame—is inherently stable.

As Casey has suggested the conception of absolute space cannot be disassociated from social, philosophical and scientific manifestations of the absolute—it is co-extensive. Within the scientific discourses on certainty and the absolute, one of the paradigmatic texts on this subject is Prigogine and Stengers' *Order out of Chaos* (1984), a book that shifted the perspectives from which the hierarchy of order and disorder, certainty and uncertainty were viewed. Instead of viewing the world as certain, understandable, quantifiable and measurable Prigogine and Stengers reversed this (although clearly this was more than simply a binary reversal), arguing instead that nature was inherently unstable, with order being a *temporary* occurrence in an essentially chaotic world, akin to Law's 'modes of ordering'. This shift in perspective is set within a wider genealogy of thought, through which we see that absolute space and time were taken to be part of "a simple, uniform, mechanical universe" (Toffler, 1984:xiii). This was a determined world, built on precision where no elements of chance were sanctioned (Cf. Hacking, 1990). Manifestations in the social realm were similarly predicated on equilibrium and stability, not only in the mechanical sense but also socially and morally where the ordered exposition of Enlightenment ideals were played out.

Classical science was based on the emphasis on universality: that is, the eternal existence of natural laws, drawing us back to the Newtonian articulation of the non-relational. There is with this worldview an emphasis on the general rather than the specific. Citing Hausheer, Prigogine and Stengers argue that these overarching frameworks were universalising, there was a logical relationship of "vast structures in which there should be no gaps left open for spontaneous, unattended developments" (Hausheer, 1980:xxvi cited in Prigogine & Stengers, 1984:2). General and universalising tendencies presupposed a "fundamental level" of explanation for all matter.¹⁷ Suffice to

¹⁷ This is in part shown by Bohr's atomic model, the system of electrons and protons, or Einstein's condensation of all physical laws into the 'unified field theory' (Prigogine & Stengers, 1984:28)

say that this ultimate, fundamental level of explanation was unapproachable, in part because of the role of “evolution, diversification, and instabilities” (Prigogine & Stengers, 1984:2), an ‘outpouring’ that we will concentrate on later in *Interlude II* with regard to relational space-time. For the present discussion however, at the root of classical science was the *silencing* of the world as Prigogine and Stengers term it (Cf. Serres 1995b; 2007). Science in this guise reduced the natural world to an essentially passive, inert ‘thing’ that was governed by immutable general laws. The key issue at stake with classical science and thought was the simplistic notion of the world, “governed by time-reversible fundamental laws” (Prigogine & Stengers, 1984:7). They liken this to the reductionist notion of conceiving a building simply as a collection of bricks. This cannot account for the different approaches of construction that produce a factory, home, or cathedral for example. In other words one has to appreciate the cultural, social and historical elements that lead to the manifest form: that is, the specific, positioned, and localised, rather than the generic view. In Newtonian thought these facets of overarching generality and universality were also the basis upon which the principles of deductive reasoning were situated. Reaching back to the Greeks this form of deduction offered “for the first time a form of deductive knowledge that contained a degree of certainty unaffected by convictions, expectations, or passions” (Prigogine & Stengers, 1984:38). The importance of this, especially in spatial and temporal terms, lies with the *a priori* nature of a given ‘fact’, a non-reducible ‘element’ or rather more aptly, a non-reducible ground-as-essence. The implications for the Newtonian *weltenschaung* are apparent when we consider the application of these immutable grounds to wider social systems. Prigogine and Stengers note that:

“the term *Newtonian* was now applied to everything that dealt with a system of laws, with equilibrium, or even to all situations in which natural order on one side and moral, social, and political order on the other could be expressed in terms of an all embracing harmony” (Prigogine & Stengers, 1984:29).

This harmonious equilibrium of graceful order at the natural level gets transposed onto social order, as we saw in terms of a singular order; so the natural equilibrium becomes social equilibrium, presupposing a kind of balance. This spreads out into the social realm, notably with the rise of the factory system as a social machine, an issue developed further in *Chapter One*.¹⁸ In this world of universal principles, control and manipulation are ever present, where “any science that conceives of the world as being governed according to a universal theoretical plan that reduces its various riches to the drab applications of general laws thereby becomes an instrument of domination” (Prigogine & Stengers, 1984:32). In this decisive statement we see a number of aspects that are of importance to the present debate: firstly, the role of planning is suggestive of a systematic approach. Secondly, the reductionist tendency governs through reducing the ‘richness’ of complexity (i.e., space is not actually content-neutral). Thirdly, general laws imply that the systematic approach emphasises a certain type of scientific ideology, that of the classical, deductive approach. Finally, domination: a further quote from Prigogine and Stengers neatly defines the means of control: “And man, a stranger to the world, sets himself up as its master” (Prigogine & Stengers, 1984:32). The notion of mastery is the crux of this interlude.

As we shall see later in this argument such reductionist tendencies of stable order are always idealised, although they are never passive. Instead, they become the sites of ever-increasing attempts to impose the artificial onto the natural (see Blomley, 2007; Scott, 1998). The discussion of the Newtonian classical approach, notably the issue of ‘immovability’, emphasises how science imposed these universal laws on the world given the supposedly passive, neutral nature of space and time. This is an important facet of the present debate, and posits the critical difference between an imposition *on* the surface of the earth (Burnett, 2003), as compared to a working *with*. Such ideologies of imposition

¹⁸ On the machinic metaphor in organisational studies see Morgan (1986:19-38).

pervade the imperialist mindset, where the surface of the globe is “to be occupied rather than a world to be inhabited” (Ingold, 2000b:155). The implications of this statement are profound, for it foregrounds the impression that the world is a “*preformed* surface waiting to be occupied” (Ingold, 2000a:214 my emphasis). This suggests how space is systematised through specific concrete techniques of domination. The practices of modern science were there to ‘mimic’ the God-like position of surveyor:

“The human mind, incorporated in a body subject to the laws of nature, can, by means of experimental devices, obtain access to the vantage point from which God himself surveys the world, to the divine plan of which this world is a tangible expression” (Prigogine & Stengers, 1984:50).

The determining factor concerns the vantage point from which one can govern the ‘world’ (see Waldheim, 1999). As with Pye’s ‘shape determining systems’, organisation is a key characteristic of this. For example, Prigogine and Stengers (1984:37) note the linkage between Neolithic techniques of organising the world (the breeding of animals/plants, weaving, pot-making, carpentry) and the classical approach. We might think of such organisational logic in terms of both the organisation of matter into material artefacts, as well as the organisation of space through systems of measurement. The organisation of space through techniques of map-making and gridding is a significant foundation of the ordering of space. As we briefly saw earlier, the fixity of absolute space bears out the ability to map it. This differentiates between the medieval period where space and time were seen as co-extensive and thus open to change (Harvey, 1996:249; Short, 2004:3), and the Renaissance where we see the development of modern space with cartographic techniques that disassociate space and time (Cosgrove, 1999). Again, this separation produces a perception of space that is neutral, passive and unchanging, thus open to forms of mapping and gridding that shaped how the world was viewed. The question of cartographic vision and surveillance is a significant aspect of Scott’s work on the modern state’s attempt to make the natural and social world *legible*. Fundamentally this involves a

concentration of vision, or as Scott sees it, a “narrowing of the field of vision” (1998:13), resulting in the delimitation of a field of knowledge that brackets-off (or divides in the Latourian scheme) complexity through regimentation and gridding. This process of making legible implies a set of representational mechanisms such as the cadastral map, censuses and “standardized units of measurement” (Scott, 1998:77), all designed to hold meaning, and the natural and social worlds stable.¹⁹ Such mechanisms of making the world legible not only concern how the world was viewed but also how it was produced and appropriated. For, as Short points out, the “emergence of colonial cartographies as navigation was used to find new lands and the techniques of spatial surveillance were used to map and appropriate new territories” (2004:6). This forefronts the political implications of absolute space in terms of manifest control, most tellingly through territoriality and power (Sack, 1986).

A parallel logic of control has profoundly underlined approaches to absolute time, in terms of the means to organise and order it (see Stengers, 1997:199-203). The notion of time-control has been disseminated most famously by E.P. Thompson in his article ‘Time, Work-Discipline, and Industrial Capitalism’ (Thompson, 1967). Although much of Thompson’s argument now stands in relation to more recent conceptualisations of time and timings as multiple, heterogeneous, ‘evental’ formations (see Glennie & Thrift, 1996) his notion of time-discipline offers a useful lens to posit the idea of a mechanistic ideology of time (and space). Thompson’s overarching thesis is that the development of the clock exemplifies a shift in the role of time within industrial societies, notably in relation to a growing disciplinary and organisational culture. Prior to the mass-dominance of clock time through the growing proliferation of cheap timepieces, the notion of time-sense was, in part, determined by the cyclical rhythms of nature or

¹⁹ In Scott’s critique this is the central mission of the modern state in its attempt to exert control over populations, as well as the natural world through urban planning and industrial-scale agriculture alike.

quotidian practices specific to local cultures (Thompson, 1967:58). It is clear, however, from Thompson's thesis that the conception of time in the pre-industrial era was driven by a form of proto-organisational logic, where the necessities of agricultural work would determine the pattern of the working day: this he terms "task-orientation" (Thompson, 1967:60). For Adam (2006:121) the remit of such forms of "time reckoning" was to overcome the inherent variability of time through a form of social *patterning*, where even the localised foundations of difference were in some sense 'measured' and plotted. The overall shift in the concept, and concrete manifestation, of temporality was not instantaneous but rather took place over a broad historical period. For example, Thompson notes how "from the fourteenth century onwards church clocks and public clocks were erected in the cities and large market towns" (Thompson, 1967:63), but adds that the issue of accuracy and the continued use of sundials up until the nineteenth century means that the regimentation of time was not wholly in place by the industrial revolution. It is clear however that industrialisation and the division of labour transformed time from earlier task-oriented formations to that of the Calvinist work ethic of time-as-commodity (Mars, 1983:76; Thompson, 1967:61). The commoditisation of time, instituted by the clock, reduced time to a tradable unit. Thus we begin to appreciate the growing conflation of time with speed: an issue clearly critical to the discussions of globalisation and JIT in the last chapter (Schoenberger, 1994:57-58). The measurement of time and its quantification implies that it can be mastered through its unitisation. Indeed time is the synchronisation and regimentation of labour, as we will shortly see in *Chapter One* with regard to the scientific management of Taylorism. From a somewhat different intellectual stand point, but arguing a similar position, Kwinter notes that "the clock, we must remember, did not produce time, it merely standardized it and permitted, or rather *forced*, it to be correlated" (Kwinter, 2002:21 emphasis in original). This is significant. The agreed-upon nature of standardisation (an issue also discussed later in *Chapter One*) posits

time as a fixed, controllable, universal and *stable* unit of measurement and calculation (Elden, 2007; Zerubavel, 1981).

Above all then, within the absolute mode of ordering of space and time there is a *distancing* between the lived and the thought (Harvey, 1996:249). This process suggests important aspects of the means to control, to understand, to predict from afar through synoptic vision (Scott, 1998:79). Such a synoptic ‘perch’ is distanced from the specificity of the lived, in that it operates at a remove. These practices are suggestive of Modernity’s conceptions of operation at a distance, a means of control that is central to the operation and efficiency of capitalism: because it cannot be everywhere at once, simultaneously it has to predict and produce conditions that are knowable. It is clear that the doctrines of Modernity were played out through the mantras of design, urban planning and architecture, all critical examples of spatial organisation. But for the purpose of the present discussion, even more significant was the actual way in which space and time were viewed as neutral, passive and silent. Concurrently, within classical science we see “the blending of the desire to shape the world and the desire to understand it” (Prigogine & Stengers, 1984:41). We can surmise that control and manipulation are central to the Enlightenment project of understanding the world. To know the world is to order it. This we saw with Tilly’s description of the nineteenth century social project. The method of shaping (Pye, 1964) is one of an idealised order. Idealised in the sense that it has to be envisioned so the means to manipulate the world are possible: that is, the practical shaping of the world has to be as close as possible to the constructed conceptual model. These approaches to scientific method are essentially reductive; they *simplify* the natural into a verifiable system of meaning, so that “all uncertainties could *in principle* be banished” (Harvey, 2006:272 my emphasis).

Relative Space-Time:

The difference between ‘and’ and ‘-’ in the titles to the subsections in this interlude may not appear significant. Nonetheless, in the context of the present discussion they are decisive. Where the material in the section above articulated how the separation of space *and* time engenders a sense of passivity, so that stability and order are possible through the envisioning of space and time as content-neutral, later post-Newtonian modes of thought, notably associated with Einstein and non-Euclidian geometries, began to challenge their separation. In what Harvey (2006:272) describes as “an important shift of language from space *and* time to space-time or spatio-temporality”, they are inexorably bound-up with one another. As a result it is impossible to suggest that space is immovable or always self-same, for if space is also temporal then it is in the process of constant change. This we term relational space, in that “processes do not occur *in* space but define their own spatial frame” (Harvey, 2006:273). Space is not simply a passive container, but rather, it is active. Whilst this relational view of space-time offers us a decidedly more complex appreciation of the world, and one that perhaps challenges the very notion of measurement and calculability (Harvey, 2006:274), this will be more fully outlined in *Interlude II*. For the present discussion we will focus on the constitution of relative space-time. Like relational space-time, relative space-time is populated with multiple points and locations, which are relative to each other and by whom is observing these locations (Harvey, 2006:272). Consequently we can see that the lack of relation to anything external in absolute space is rejected, and that relative space is “some movable dimension or measure of the absolute spaces; which our senses determine by its position to bodies” (Newton, 1962[1687]:6, cited in Casey, 1998:142). So, where absolute space always remains ‘selfsame’, relative space, by contrast is determined by position. This is a critical expression of the substantive difference between absolute and relative space: for the notion of the relative asserts the *potential for change according to position*. On this point it

can be argued that we see in relative space a relationship between space-time and the things that fill it. Further to this the relationship between things is stressed. Casey, for example, voices the importance of this shift in perspective when he notes that relative space is typified by “the way that things are situated vis-à-vis one another” (Casey, 1998:167). Relative space represents an acknowledgement of the position of observation and the materiality of the space itself, compared to the empty container concept of the absolute (Harvey, 2006). Essentially this concerns what is being looked at and who is looking – relative spatio-temporality is dependent on positionality rather than universal extension. Although this appears somewhat simplistic, the notion of spatio-temporality begins to demonstrate that the frame itself is movable and not fixed in position, however the frame is still enframing in overall terms (see Heidegger, 1977:19-20). Given this, any discussion of space has to be considered alongside temporality so that we conceive of the relativist position in terms of space-time rather than the separation of space and time (Harvey, 2006:272). This is a critical factor in relation to mobility.

It is however clear that the relative model does not wholly reject the roles of measurement and control. These operate according to specific circumstances that are not strictly universally operative in the way that they were under absolute space. The mode of measurement is *contingent* upon what is being observed and the “standpoint of the observer” (Harvey, 2006:273). This is a central aspect of relative space, as it highlights the move away from a universalised viewpoint toward an encroaching awareness of position and the complexity of position, as well as the complexity of ordering:

“All of this relativization, it is important to note, does not necessarily reduce or eliminate the capacity for calculability or control, but it does indicate that special rules and laws are required for the particular phenomena under consideration” (Harvey, 2006:273).

In other words, there is not a singular, universal sense of order, but rather, as Law asserted, more localised, contingent modes of ordering. In light of this Harvey offers

some further illustrations based again on modes of mapping—a given space is still mapped in relative terms but the outcome of this mapping process depends on the specific details of what is being mapped and the position at which this mapping is taking place (i.e., scale), be it speed of pedestrian movement, vehicular movement etc. Further to these he also identifies through his ‘matrix of possible meanings for space as a keyword’ (Harvey, 2006:282) some examples of how relative space is manifested: in particular he notes the “circulation and flows of energy, water, air, commodities, money, capital” (Harvey, 2006:282), clearly articulating the role of movement and mobility in relative space, but also the link between relative space-time and capitalism. In a similar vein Sloterdijk (2004:227) also notes the correlation between the mastery of space, and as he terms it “putting it to work exclusively as a conductor”. The function of space as a conductor is clearly distinct from the absolutist notion of space as simply inert. Equally, Harvey also suggested that “the movement of people, goods, services, and information takes place in a relative space because it takes money, time, energy, and the like to overcome the friction of distance” (Harvey, 1979:13, cited in Harvey, 2006:275). This articulates certain degrees of interaction, and crucially a means of interaction that is resolutely dependent on modes of control that require complex means of articulating space and time in order to deal with friction. In his matrix he notes that in relative space-time “command and control [are] difficult, requiring sophisticated techniques” (Harvey, 2006:282). Here we are privy to an important factor concerning the relationship between these modes of control in absolute and relative space; in the former it is comparatively ‘easy’ given the neutral status of absolute space, however, as we move toward more complex spatial and temporal formations control becomes increasingly difficult. Given this we now approach a noteworthy aspect of the current debate; for the role of movement in relative space-time, “of motion, mobility, displacement, acceleration, time-space compression and distancing” (Harvey, 2006:282) predicated a parallel shift in the

organisation of these relative interactions.

Not only does this suggest that relative space is constituted through movement (i.e., the relative position of objects in space-time) but it also allows us to deal with the issue of how this relative position is conceptualised, most tellingly in the way that these circulations and flows are mediated and shaped.²⁰ Significantly, Castells' description of the space of flows as "the material form of support of dominant processes and functions in the informational society" (Castells, 1996:412) provides a clear articulation of the organisational infrastructure that 'powers' the flows of information, people and objects in relative space-time. He goes on to state that "the space of flows is the material organisation of time-sharing social practices that work through flows" (Castells, 1996:412), also demonstrating that organising the circulation of relative space-time is paramount. The emphasis on the material aspects of these organisational practices is also important, as we are privy to the *interaction* between space-time and the material entities—the things—that populate space-time. We should be aware that the relative constitution of space-time and the increasingly sophisticated techniques of 'command and control' do not preclude the strategies of imposition and territoriality that we saw with absolute space; instead it is decisive to suggest that there are twofold strategies at work, firstly the continued attempts to posit a 'closed' spatial arrangement that provides the means to secure space (walls, doors, urban grids, etc.), but simultaneously the techniques to *distribute* objects and subjects. As Thrift states: "a carefully constructed absolute space begets this relative space" (Thrift, 2004a:592). So where the modes of position and interaction in relative space-time foster mobility, the measurable and programmable qualities associated with the Newtonian absolute arguably generate movement through the "sense of security" (Harvey, 2006:282) that absolute space provides. Calculation and measure as part of this world of flows is perhaps emphasised when we consider

²⁰ An obvious correlate to the control of circulations can be seen with Haussmann's reconfiguration of Paris (Scott, 1998:59-62).

commodity movements – for the global commodity chains rely on a serviceable network of flows that permit a routine of distribution to be established.²¹ This form of cyclical distribution is essentially premised on repeat journeys along an established space of flows—again, this is absolute space *and* relative space-time. The concrescence of these two modes of spatio-temporal thought suggests that even as we move ‘up’ the scale of complexity the preceding mode of spatio-temporality is not necessarily redundant. However the question of increasingly complex interactions of space-time—in light of the global power of transnational corporations (TNCs) for example—does begin to posit a shift in how we might consider the very notion of control (see Deleuze, 1992b). In light of this Thrift’s work in particular has recognised that “what we are seeing is a new form of seeing, one which tracks and can *cope with uncertainty* in ways previously unknown” (Thrift, 2004a:584 my emphasis). ‘Things’ within relative space-time are given position via the technology of computation, in order to enhance the speed and efficiency of movement-space by bringing together object and space in a process of constant locatability. In such a situation we see that movement-space as articulated by Thrift problematises the notion of position in relative space-time: for principally position becomes location, but more profoundly *locatability*, i.e., the means to constantly account for position.

²¹ Regis Debray (2000:16) offers an interesting adjunct to this notion of flow in his discussions of the nature of organised networks. He notes the difference between the power of the Roman Empire which was based around accumulation and stockpiling, whereas the hegemonic power of the US is determined by dynamism, flows, and network architecture. The links to the earlier outline of Fordist and post-Fordist models of production and distribution are clear.

Conclusions:

Relative space-time is obviously an important ‘re-conceptualisation’ of the spatial and temporal, promoting a more realistic picture of spatial relations through forms of reflexivity: however, given its historical legacy it is still a somewhat stable image of spatiality. If we turn to other material on spatiality (Connolly, 2010; Thrift, 2006b; Massey, 2005) such a stark image of stability is far from dominant. Massey for example speaks of the “the essential multiplicities of the spatial” (Massey, 2005:82), a way of thinking space which may offer a politically divergent series of options. The spectre of uncertainty, or the “the dangerous flock of chaotic morphologies” (Serres, 1982a:53), will be considered in-depth through the notion of relational space-time in *Part Two* of the thesis.

For the moment, one of the remits of this section has been to begin to consider the connective impetus of capitalist space-time, and particularly the relationship with both absolutist and relative notions of space-time. The work of Prigogine and Stengers, whilst not wholly concentrated on the spatial nature of the absolute, provided ample means of considering the wider issues of Newtonian, classical thought, specifically the desire for a harmonious equilibrium of sorts through a mechanistic view of the world; an image now long redundant in terms of intellectual thought at least. These points highlight the silencing of the world that abounds in classical science. The abstract notions of the absolute are concretised through the materialities of control that we associate with “walls, bridges, doors [...] bodies of water, territorial markers, physical boundaries and barriers” (Harvey, 2006:282). As Harvey also argues, there is not a necessary hierarchical order of complexity where the relational (as we will come to in *Interlude II*) encompasses relative space-time, and the relative encompass the absolute. Rather, they are in “dialectical tension” (Harvey, 2006:276). This tensile relationship fosters a sense of overlap between the various modes of space-time, and in particular it is clear from the work in this field

that the issue of control is a continued ideological impulse in relative space-time, especially in light of the link between this and the various flows of energy, goods, information, people, money etc., that Harvey identifies.

Through the situated, positioned and non-neutral nature of relative space-time the modes of control may not be as fixed or generalised as those of absolute space, however, they require an even greater sense of specific, located control mechanisms. This is where I attempted to link relative space-time to Law's discussion of modes of ordering. Rather than a stable, singular order as part of a passive absolute space, multiple orderings abound: "Order is not something that always exists in a pristine state, fully formed" (Hetherington, 1997:10), rather it is itself relative. There is a continual oscillation in process, and as such the construction of *orders* is itself oscillatory. As Anderson and Harrison suggest, "quite simply, there is no order, there is only multiple orderings, and practices are the context for and necessary condition of those orders, each of which must be actively composed or fail" (2010:18; also see Halewood & Michael, 2008:47). These discussions raise the fundamental question of the processes through which modes of ordering are constructed (Lee, 1998:39), maintained (Graham and Thrift 2007), and pre-empted (Anderson 2010; Lakoff & Collier 2010). It is this idea that characterises the move away from Newtonian conceptions of space toward an appreciation of the position of observation. Thrift's work on movement-space demonstrates that under the governances of contemporary capitalism the question of position-as-context promotes the idea of flow as relative position, and thus shifts position toward the overtly political issue of location and locatability.

Overall then whilst the notion of singular order had a direct bearing on the distinctly Modern project, it has had a lasting legacy, as articulated by Tilly (1984). This is not to suggest that the social projects of the twentieth and twenty-first are necessarily the same, nor radically different. As Law's work on modes of ordering manifestly illustrates,

the central shift that has occurred in this period is the recognition of how orderings are operationalised. So rather than a sense of a stable social order, the production of orderings more realistically asserts the ongoing, process-based nature of temporary orderings. Whilst this helpfully asserts the changing perspectives on notions of uncertainty and how these are in themselves determinants of social systems (an issue pursued in *Part Two*) the argument developed over the next two chapters is that an organisational logic continues to prevail in the specific context of distributive space, and one that maintains a set of visions of this space and others, which are part of a legacy of spatial and temporal modes of ordering stemming from military and infrastructural forms of power.

Chapter One:

**From Chaos to Order? The 'Packaging of Efficiency' in the Development of the
Standardised, Intermodal Shipping Container**

Introduction:

A report, commissioned in 1966 by the British Board of Trade, from the management consultants McKinsey & Company, outlined the potential benefits of containerisation for British trade, also attesting to the wider global economics of containerisation. *Containerization – Its Trends, Significance and Implications* (McKinsey & Co., 1966), outlined the likely benefits of the full implementation of containerisation and its attendant infrastructural developments. This initial report was followed by a more extensive one in 1967, *Containerization: The Key to Low-Cost Transport* (McKinsey & Co., 1967). Both reports develop a forthright argument, extolling the economic implications for British trade. Central to both reports is the relationship between standardisation, infrastructural efficiency and lowered transport costs. More specifically, the 1967 report (building on the earlier conclusions of the 1966 report) draws four main conclusions from the move toward containerisation. It would result in:

- 1) A reduction in transport costs
- 2) Larger economies of scale which become possible with larger container ships
- 3) Integration and consolidation of the transport industry
- 4) Growing importance of transport for global trade (McKinsey & Co., 1967:iv)

The narrative of both reports is decidedly economic, and whilst this is central to the following debate, I will also broaden out the argument to address the role of mechanisation, automation and the attendant effects on spatio-temporality. To briefly focus on the economic factors: the imperative of containerisation is exemplified by the reduction in overall costs due to lower packaging and transportation costs, coupled with the increased speed of transit, allegedly reduced, for example, from twenty to ten days on a journey from Birmingham to Chicago (McKinsey & Co., 1966:2). Further to this, the losses from theft and damage seen with break-bulk cargoes are reduced, as are resultant

insurance costs.²² Similarly, a reduction in cargo handling costs at ports would be seen as a result, once again, of the increased speed of handling and a significant reduction in labour costs. In part, both reports argue that such overarching benefits would only follow widespread consolidation of the freight industry, entailing the “vertical integration of land, port and sea transport operations” (McKinsey & Co., 1966:4). Such consolidation of the industry is deemed necessary due to the large capital investment in containers and infrastructure.

Equally telling for my argument is that the economic outlay is also claimed to necessitate the need for “unified control” of the transport routes (McKinsey & Co., 1966:4). The extent of control over the entire network is deemed critical in order to overcome the limitations of the non-integrated approaches to freight seen with non-containerised cargo. Following the structural changes in bulk cargo movements such as oil, the 1967 report argues for a radical restructuring of the freight industry, positing

“the need to look upon transport as an integrated process from origin to destination and the potential economies of scale achievable with high volumes will eventually lead to the emergence of a small number of large organizations operating on a worldwide basis” (McKinsey & Co., 1967:iv)

Rather strikingly the movement of the container through the entire commodity network is seen as offering the primary means of economic as well as spatial control. Control is central to containerisation: an issue this chapter considers. Perhaps the most immediate recommendation of both reports is the impact of homogenisation on other cargo handling processes, most crucially that of oil (McKinsey & Co., 1966:3). Added to this, the increase in scale of oil tankers proved to be a decisive factor in reducing operating costs (McKinsey & Co., 1967:16). However, the key factor that is said to have reduced operating costs and made the transport of bulk cargoes evermore efficient was the *standardisation* of the system. Oil as a commodity is viewed as a form of “homogenous

²² Break-bulk cargoes are individual items of cargo, as opposed to containerised cargo or bulk cargoes such as oil.

standardized product” (McKinsey & Co., 1967:5). Interestingly the specific materialities of this bulk cargo are eliminated, and it is treated as a unified form. This is precisely where we see the logic of homogeneity being applied across all cargoes: the inconsistencies that Broeze (2002) and Gunston (1968) identify with the nature of loose cargo are supposedly eliminated by the standardised form of the shipping container. Under the guise of standardisation and automation all cargo is, in theory, treated as one.

The potential impact of containerisation and standardisation is present in both reports, perhaps most starkly with arguments that the reduction in costs can be accomplished by automation, leading to a situation where “expensive labour can be replaced with cheaper capital equipment – e.g., replacement of clerical staff with office machines. Material resources can be better utilized through improved process control – e.g., automated gauge controls on a rolling mill” (McKinsey & Co., 1967:3). Even more strikingly for the question of labour, systematisation is said to potentially “eliminate most of the labour formerly needed” (McKinsey & Co., 1967:4). The impact of such seismic changes in labour was clearly evident in the *actual* implementation of containerisation, for example by the Port of London Authority (PLA). The overarching conclusions of the McKinsey reports were obviously critical for British trade (Banham, 1967), and the effects of not implementing full-scale containerisation were identified by the PLA. Indeed the potential impact on the workforce at the Port of London was identified in *The Port* newspaper in response to the 1967 McKinsey Report. The headline read: “90 per cent cut in labour possible” (*The Port*, 1967:1). Such dramatic forecasts would predate the significant impact that the mechanisation of cargo handling would have on ports throughout the world, including London.

This chapter uses the McKinsey reports as a backdrop to wider debates on containerisation and the shifts in the organisation of space-time, as well as more subtle material practices and procedures. Whilst the impact on the urban and economic geographies of cities throughout the world cannot be underplayed (Banham, 1967; Smith, 1989), the main remit of this chapter is to consider the specific discussion of cargo handling. It is also to argue that the supposed paradigm shift that containerisation embodied, was actually much more gradual in its development. Indeed, as the first section suggests, prior to the development of full-scale intermodal containerisation the ideology of systemic efficiency in the form of spatial and temporal ordering was present. Where, perhaps, this differs from intermodal containerisation is in the localised approaches to the question of specific modes of ordering. For example, the potential cost reductions offered by the use of pallets were relatively limited in scope as they were dependent on limited means to accelerate the entire process of cargo handling. As the section on intermodal containerisation goes on to argue, the movement of cargo on pallets or non-standardised containers is an embryonic version of the later fully standardised system of containerisation. Where this differs is in the distribution of the same logic of efficiency and control across the entire transport infrastructure, embracing both the shipping industry, as well as the road and rail freight sectors. Following the wider discussions concerning orderings in the previous *Interlude* the conceptual bedrock of this chapter is the issue of stabilisation through standardisation. Although this will be decisively critiqued in *Part Two* of the thesis, in this chapter I look to the attempts to stabilise the interconnections between the various elements of the cargo handling system, in part to consider the central notion of controlling inter-changeability through standardisation. This bears on my central idea of the ‘packaging of efficiency’, which I link to the established debates on black-boxing and immutable mobiles (Latour, 1987a; 1990) – both of which further embody the role of stabilisation.

Pre-Containerisation:

“The traditional modus operandi of the world’s trade really is outmoded” (Gunston, 1968:62)

Writing in 1968 in the journal *Design*, Bill Gunston makes the case for wide-scale implementation of standardised global trade circulation. For him, the development of an integrated system would reflect the wider technologically determined notion of Modern progress. In particular he describes the incongruity of “a sweating army of stevedores” loading loose cargoes of break-bulk items such as bales, sacks or dented boxes onto technologically sophisticated vehicles like the then-new Boeing 747 (Gunston, 1968:62). However, Gunston’s observations are rather historically ungrounded. It would be overstating the argument to suggest that prior to the intermodal containerisation revolution of the 1960s and 1970s the commodity distribution system was wholly non-mechanised or non-systematised. There are numerous examples where localised procedures and technologies demonstrate early forms of mechanised commodity movement (Owen, 1962; Zimmer, 1905). The key area of divergence between early methods of mechanisation and the later wide-scale standardisation of intermodal containerisation is the speed and efficiency of *inter-changeability*. There was a lack of systemic completeness: in the case of break-bulk cargo if it were being discharged from a vessel it would have to be lashed to the winch or crane by stevedores, before being landed on the dockside. Again, the ropes would have to be removed before being loaded onto a forklift truck, then packed in the dockside warehouse, ready to be collected by a road haulage company at a later time. Similarly Gunston notes how prior to containerisation freight handling was also typified by the lack of integration across the various organisations responsible for freight distribution, as well as the technologies. This resulted in a situation where “manufacturers, road hauliers, freight forwarders, shippers, shipping companies, railways, stevedoring companies, consolidators” (Gunston, 1968:59)

operated in separation to one another. Similarly the various types of cargo were typified by a lack of uniformity, so one saw disparate arrays of packaged items such as crates, pallets, individual cans, sacks, bales, as well as animal carcasses.²³ This is also seen with the lack of integration across the system, whereby each of the points of interchange (the warehouses, packing crates, cranes, trucks, ships, trucks etc.) were incompatible, in terms of the need to load and unload between each. For Gunston, and others advocating the move toward containerisation (McKinsey & Co., 1966; McKinsey & Co., 1967; no author, 1969; 1970), this resulted in widespread inefficiencies throughout the freight industry as a whole. In particular, the most notable inefficiency was that of wasted time. It is argued that the manpower used to handle such disparate forms of cargo was wasteful. Due to the irregularity of the system as a whole, Gunston perceived that the workforce was essentially under-utilised, implying that the 'idleness' of the labour force could be replaced by the efficiencies of technology. He states, for example, that due to the non-integrated nature of freight transport prior to containerisation, 75% of the North Atlantic run was spent in port (Gunston, 1968:59). The overarching premise, then, is unnecessary effort, inefficient labour, and above all wasted time.

Specifically in relation to cargo items, it is apparent that the nature of distributive space prior to containerisation was made up of disparate entities, including the aforementioned diversity of loose cargo. The multiplicity of loose cargo was a demand on time and space. Temporally, the diversity of shapes and forms of cargo resulted in lengthy procedures to load and discharge cargo from one form of transport to another – individual animal carcasses, for example, are shown being discharged from the *Clan MacDongall* at the port of Tilbury in April 1938 (No Author, 1938). Stevedores unpack the lamb carcasses and load them individually onto netting for the crane to then winch them

²³ An interesting corollary comes from Cronon's discussion of the benefits that individual sacks provided for the Chicago grain industry in the 1840's. He suggests that individual sacking prevented the adulteration of grain, a situation that would change when grain transportation was moved out of sacks and became part of the automated grain elevator (see Cronon, 1991:107-111).

onto the dockside. Such scenes point to the time and effort necessary to carry out such tasks, with each carcass individually wrapped. Whilst these are wrapped to provide protection, it is telling that each carcass is treated as an individual entity. As I will argue presently, the intermodal shipping container is a scaled-up version of the individualised unit of cargo, but one that differs in two crucial distinctions, that of formal uniformity and inter-changeability. The sheer diversity of shape of the various cargo items pre-containerisation is the decisive factor in this aspect of the argument. If we take the example of stowing barrels it is evident from the literature on stowage techniques (Ford, 1950:83) that their form resulted in the use of specific methods, both to secure the barrels but more importantly to counter the spatial limitations. The shape of the barrels (Figure 4) necessitated the use of heavy dunnage – pieces of wood (often cordwood) that secure and fill-in the inconsistencies of the barrel shape. We can see how the void space at the end of the row is taken-up with heavy dunnage to counter the wasted space, and to alleviate shifting cargo during voyage.²⁴ The practicalities of stowage are evident in this image, as it is clear that security of the barrels demands an armature to protect the load from movement (also see Figure 5). To a further extent the use of such means to hold in place loose cargo points to a level of improvisation, whereby the nailing of simple wooden boards is the most practical method of countering the sheer diversity of cargo. Overall this demonstrates the level of effort required to literally *stabilise* the load in the hold.

In part, the job of the stevedore in this period was to counter the spatial limitations of shape by packing cargo as efficiently as possible, in order to “get the most possible goods into the box” (Ford, 1950:60). Although the techniques of stowage, including the spontaneous and improvised approaches to formal diversity of loads, may

²⁴ It should be noted that even with the move towards fully-standardised containers the nature of packing the containers themselves means that dunnage is still utilised, albeit in the form of air-filled packaging materials.

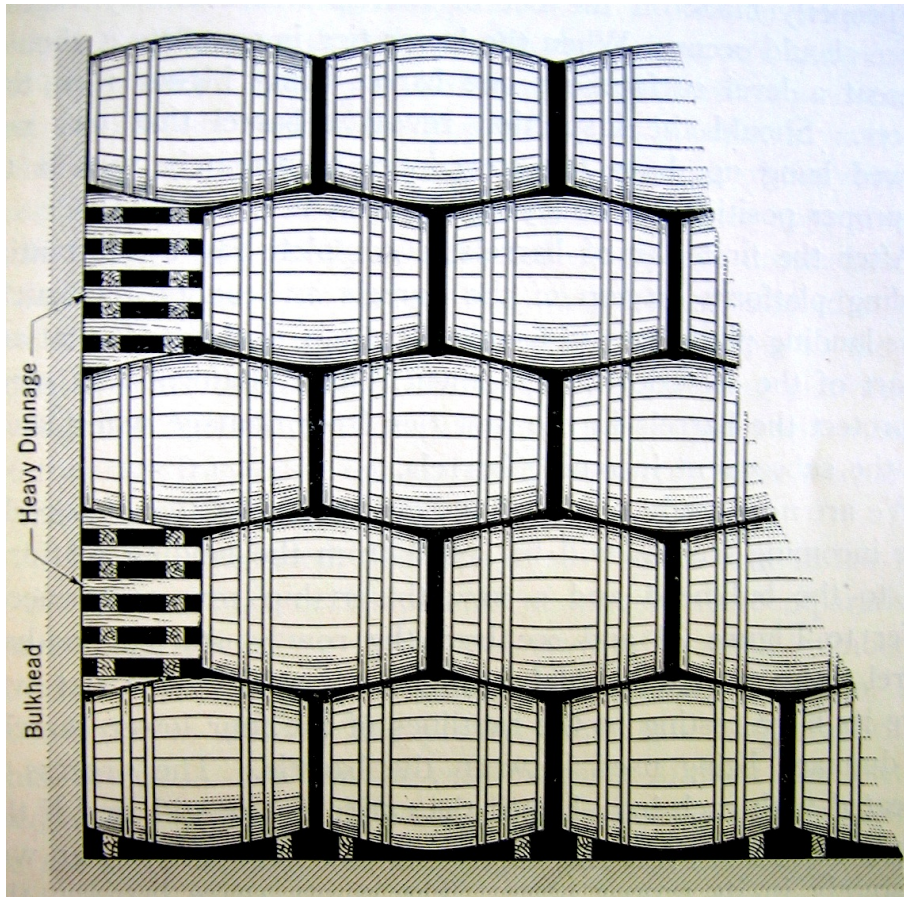


Figure 4: Barrels in stow (Source: Ford, 1950:53)



Figure 5: Dunnage walls (Source: Huntington, 1964:21)

seem somewhat rudimentary in comparison to the calculative logic of contemporary computer-controlled loading (Corry & Kozan, 2008), these techniques are early forms of spatio-temporal organisation designed to overcome the diversity of shape. The process of regularisation can be further seen in Figure 6, where an irregularly sized cargo of cylindrical cabling gear has to be stored in the hold amongst other break-bulk items (boxes can be seen in the background). Given that it extends beyond the normal height of the hold, an improvised deck has to be constructed in order to enable the cable gear to be housed, and for other cargo to be stored around it. Figure 7 demonstrates the packing and carpentry skills required to do so.

Moreover, the remit of cargo stowage on board the vessels of this period was, according to Ford (1950:60), “to arrange the stowage so that the speed of loading and unloading is at a maximum and the cost to a minimum”. The function of stowage was not dissimilar to that of intermodal containerisation: it was intended to facilitate the most efficient spatio-temporal coordination of cargo handling. The length of time taken to achieve this level of coordination should not obscure the efficiency and skill of loading and discharging ships.²⁵ The intricacy and complexity of cargo plans offer a further example of the spatial and temporal ordering strategies in place at this time (see Figure 8). Such procedures testify to a significant form of spatial knowledge and awareness, both in terms of the efficiency of filling defined cargo holds as well as an appreciation of weight distribution; the latter in particular being critical to the ability of vessels to safely sail without listing. Evident in such plans (and the more localised hatch distribution lists) is the economic significance of spatio-temporal organisation. Cargo plans and hatch lists enabled the correct number of stevedores to be employed to unload the cargo (Ford, 1950:205). Further to this, the correct distribution of cargo facilitated the most efficient and quick off-loading at a ship’s various ports of call. The question of speed is central:

²⁵ The importance of coordination is demonstrated by the fact that the planning of cargo distribution on board the vessels was carried out by full-time dock clerks (Ford, 1950:204).

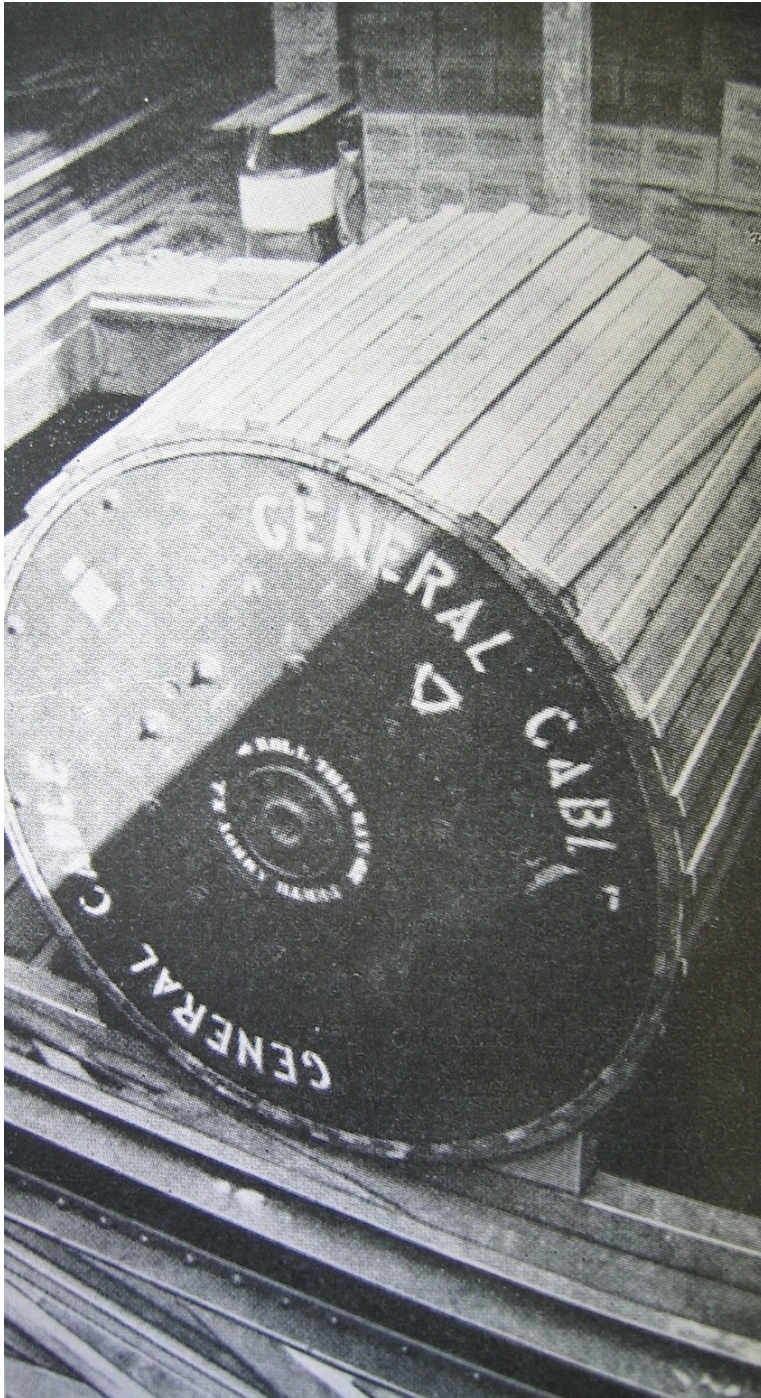


Figure 6: Cable gearing (Source: Ford, 1950:286)

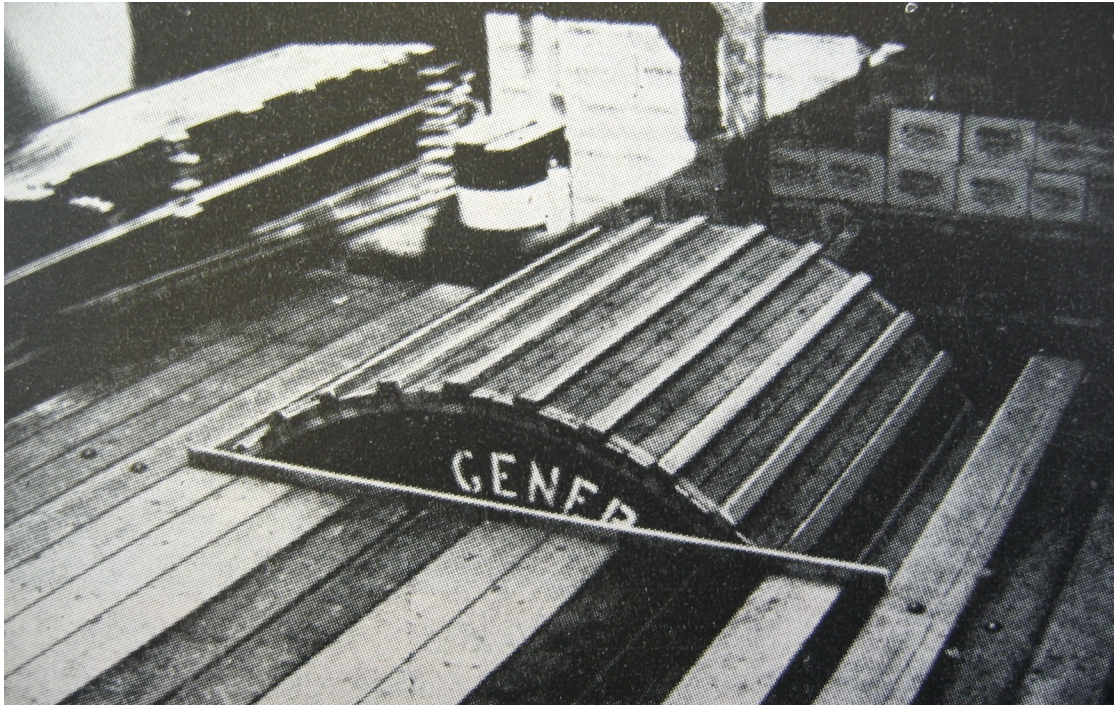


Figure 7: Cable gearing 'packaged' (Source: Ford, 1950:287)

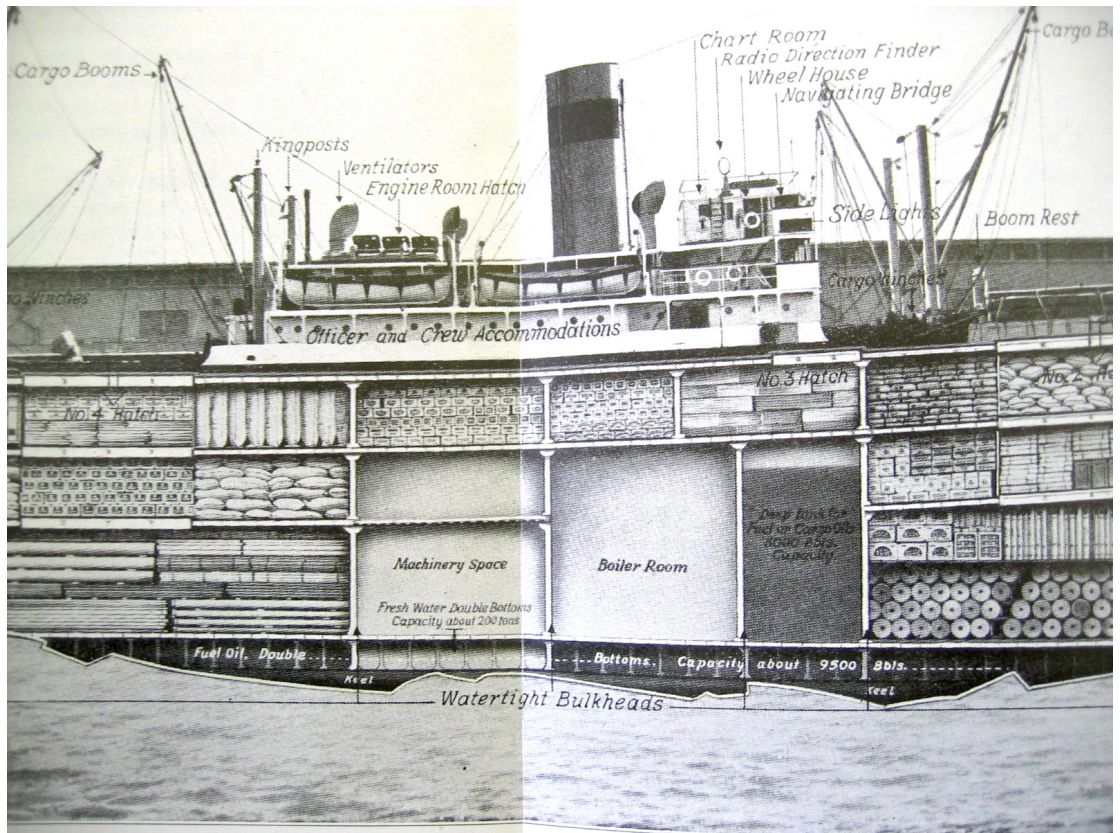


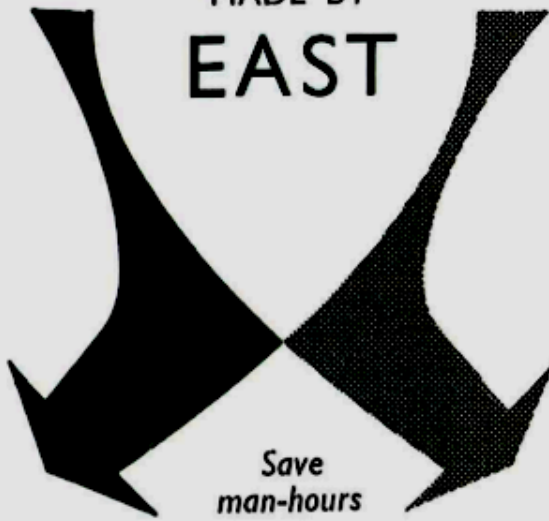
Figure 8: Illustrated cargo plan (Source: Huntington, 1964:25)

With cargo-hold planning there is evidence of pre-determined spatial arrangement, which predates the pre-determined approaches of containerisation. However, one crucial difference is evident: that of the spatial inefficiencies of cargo.

Prior to intermodal containerisation the system of packaging was clearly based on an organisational logic, albeit a rather more labour-intensive version. As will be outlined later in this chapter, the development of containerisation can be seen to follow this logic, but extending the spatio-temporal modes of ordering even further into a system of 'packaged efficiency'. Up until the wide-scale rollout of containerisation in the 1970s, early forms of mechanisation and homogenisation of cargo were present within cargo handling. Of the latter, perhaps the most notable example of regularisation of cargo was the use of pallets. Whilst still in evidence today in some commercial ports (House, 2005:28; Ashton, 2007), the use of pallets prefigures the uniformity and formal regularity of the intermodal shipping container. Figure 9 advertises the benefits of pallets over non-palletised cargo, stating that it saves man-hours, thus cutting costs. Crucially, for my argument it does so through spatial organisation, namely by homogenising the diversity of cargo. This is akin to the discussions in *Interlude I* concerning the shaping of action, in that the formalisation of shape determines the resultant systemic actions that surround it. By doing so it facilitates the ease of loading: according to the advert it "takes goods right from shed to ship without reloading" via forklift truck or winch. Decisively for my positioning of regularisation within the wider genealogy of cargo handling, the McKinsey report of 1967 notes how palletisation represents an intermediate stage in the move toward a full-scale system of containerisation (McKinsey & Co., 1967:74). In noting such a step, the pallet predates many of the central features of the intermodal, standardised container, as we know it today. In particular the regularisation of break-bulk cargoes provided quicker turnaround times, teamed with greater productivity of labour and simplification of the dockside in terms of congestion (McKinsey & Co., 1967:75).

PALLETS

MADE BY
EAST



Save
man-hours

•
Cut costs



From truck to crane

Patent No. 697229

Equally at home on truck or crane, takes goods right from shed to ship without reloading—saving man-hours, cutting costs! Steel channels combined with $1\frac{1}{4}$ " boards, securely bolted top and bottom, make the pallet a hollow beam of maximum strength, lightness and durability. Standard size 6' x 4' 6" to carry 3 tons, or to order.

Extensively used by Port Authorities.

Transport and Warehousing Organizations

**EAST & SON LTD., BERKHAMSTED,
HERTS.**

Figure 9: Pallets advertisement (Source: PLA Monthly, 1967:xxvi)

Critically the questions of speed and improved labour productivity point to the creeping regularisation of worker skill. This is most apparent when we take the issue of cargo handling: palletisation (and more decisively containerisation later on) attempts to evacuate labour from the process, wherever possible. The supposed reduction in discharge and loading rates comes from the scaling-up of unit size that the pallet offers, but this results in less contact between individual workers and loose cargo. Indeed, the removal of labour is deemed to be a central facet of full automation (McKinsey & Co., 1967:4). This is symbiotic with the way in which space and time are viewed in a deterministic manner. Whilst the pallet is said to improve spatial efficiency, thus speeding up the process of loading and discharge, it does not fully *optimise* in the way that containerisation would. As the report states, “up to eight pallets would be handled at each interchange, as opposed to one 20-ft. container” (McKinsey & Co., 1967:75). Again, this is mapped onto the resultant reduction in labour costs—“7 tons per man hour to over 50 tons per man hour [with containerisation]” (McKinsey & Co., 1967:75). Further limitations of pallets are outlined: they do not offer the potential to unitise larger forms of cargo, being more suited to smaller-scale domestic products. Again, the issue of size emerges. If pallets increased in scale then the greater homogenisation of cargo would be possible. Finally, the McKinsey report notes that the full, unrestricted movement of cargo on a global basis is limited due to the inability to securely seal pallets. Through these various aspects we begin to appreciate the remit of unitisation more widely – to implement the most efficient process of transfer by overcoming the perceived limitations of labour, as well as spatio-temporal inefficiencies.

Non-Standardised Containers:

The process of regularisation that the pallet begins to highlight is extended further by the unitisation of packing crates, a seeming extension of the cubic form of the pallet. Even

more significantly, this is seen with the design of fully sealed non-standardised containers, which at first appear almost identical in form to the later intermodal containers (Figure 10). The idea of transporting freight in some form of container had been in evidence since the late 19th Century when British and French railways used wooden boxes on the flatbed rail wagons (Levinson, 2006:29; also see No Author, 1969; Owen, 1962). Although in a different socio-political context there is an attendant legacy of non-standardised containers in military freight transport, namely the Conex box. First introduced in the early 1950s these 5-ton steel containers were used during the Korean War to ship soldiers' belongings, but by the time of the Vietnam War the Conex boxes were to play a decisive logistical role in the transportation of personal belongings, equipment and weapons (Levinson, 2006:174).²⁶

These non-standard containers smooth-out the inconsistencies of heterogeneous cargo: they multiply the benefits of the pallet by extending the homogeneity cargo beyond the base.²⁷ Their cubic uniformity regularises the system even more. In doing so it enabled cargo to be stacked on top of one another, thus alleviating some of the spatial inefficiencies and inconsistencies seen with the stowing of irregularly shaped cargoes. Overall, the potential of unitised container cargo was highlighted by Owen, when he stated:

“Most types of liquids and solids may someday be moved in sealed containers interchangeable among road, rail, air, and marine transport. Advantages would include reduction in damage and loss in the time and cost of loading and unloading. Containers may prove to be the catalyst that integrates the various components of the transport sector which are now being independently planned, financed, and operated” (Owen, 1962:410).

²⁶ As we shall see below, the phasing-out of Conex boxes for specifically military purposes in 1968 coincided with the growing dominance of the commercial shipping container.

²⁷ Early examples of containerised cargo shipments include the Link-Line service between Liverpool-Belfast, started in January 1959. This service used 12 ton capacity aluminium containers, but these were non-standard in design and used rounded top edges (No Author, 1959). Levinson (2006:31) notes that a similar service was in operation in Denmark in 1951, and the Transportainer was developed by the Pittsburgh-based Dravo Corporation in 1954.



Figure 10: Sealed container of Ford spare parts being loaded into *Waroonga* (Source: Museum of Docklands, archive box ‘Container Images’ loc.3.4)

Similarly the design of these embryonic containers, or ‘vans’ as they are termed, allows time to be saved through the increase in loading and discharge speed, added to which “dunnage does not have to be loaded and unloaded in the hold to make walls around cargo” (Huntington, 1964:38). The wider notion of ‘security’ also needs to be expanded on at this point. As the previous issue around the lack of ability to seal pallets attested to, the added security benefits of the non-standardised containers are clearly evident at this time. Sealed containers protected cargo from damage (a common problem with the use

of stevedore hooks for example), and significantly alleviated problems of petty theft by the workforce (see House, 2005:28; Huntington, 1964:76; Mars, 1983:183).²⁸

Although relatively late in the overall scope of containerisation, the protection of commodities through the use of containers is evidenced by an example from 1967. In March of that year, an ‘experiment’ was staged which illustrates the purported benefits of containerised cargo. The experiment consisted of the first-ever shipment of Japanese canned red salmon from Japan to London in a non-standard shipping container. When the *Chitral* arrived in London’s King George V Dock on 25 April it still took eight men to guide the container onto the back of a waiting lorry. This is a notable factor, for it highlights how human labour was still necessary to discharge the container, whilst more decisively illustrating how the partial *inter-changeability* of the container was in evidence. That is, the regularised form of the container allowed it to be loaded straight onto a truck without it being held in storage or packed separately. The importance of quick turnaround is critical to this ‘experiment’, for it was suggested that the container “was in Manchester housewives’ larder within 24 hours. [...] One load went directly to Wright & Green Ltd., Manchester, from where it will be distributed to the Spar chain of grocers” (No Author, 1967). As Huntington commented earlier, the protection of the cargo was an important factor in the use of early containers. According to the director of the importers: “I have never seen cans which have travelled 10,000 miles in such excellent condition” (Berisford, cited in No Author, 1967).²⁹ The problem of damage and safe passage was obviously one of the reasons for the massive impact of containerisation in

²⁸ In an earlier example from the 18th century, the importation of loose bulk tobacco from Maryland and Virginia was outlawed, and the stipulation made that all tobacco be imported in casks, chests, or cases in order to reduce the potential for the smuggling of other goods inside the bundles of tobacco (Rive, 1929:558). This is an issue we will turn to again in *Chapter Four*.

²⁹ The significance of this ‘experiment’ is perhaps demonstrated by the fact that a reception was held on board the ship on 3 May 1967 to mark the event, with a board in the background stating “P&O/Berisford’s Japanese canned salmon container experiment” (No Author, 1967).

terms of protecting items that would previously have been loosely packed on board.³⁰ This example offers some interesting conclusions concerning the scope of homogenised, unitised cargo. It highlights the key benefits that would later come to exemplify fully standardised intermodal containerisation, namely:

- Protection of cargo, both from damage and theft
- Efficiencies of form for stowing in the hold
- Speed of loading and discharge through simplification of the process
- Ability to quickly interchange between different forms of transport
- Reduction in labour costs

These predecessors of fully standardised containers point to the importance of linkage: that is, how the regularised form of the sealed container sped-up the process of moving cargo from one transport node to another. Thus, the attendant *system* of transfer was equally important in terms of mechanising the movement of the containers in port and beyond. However, at this time in the mid-late 1960s a fully implemented system was not apparent. Demonstrated in Figures 10 & 11, even ISO containers (which were present at this time as we will see shortly) were often loaded onto truck beds that were not designed to carry such items. The images in question testify to the still-present forms of improvisation, with the advantages of containerisation (be it standardised or not at this point) being somewhat outweighed by the need to lash the container onto a non-standardised truck with rudimentary roping. What does this suggest? Above all, it points to a lack of wider systemic compatibility, whereby the purported benefits of unitised cargo are not fully implemented across the *entire* system. As we will shortly see, systemic compatibility and completeness through the development of fully standardised *infrastructure* was the wider goal of containerisation. As such, the spatial homogenisation of cargo represents a developing sense of organisational logic. At this point in time it also

³⁰ Although relatively late in the overall systematisation of cargo movement these examples demonstrate how there were manifest inconsistencies in the development of non-standardised containers. These practices did not result in the total elimination of loosely packed cargo. Indeed there is a telling mix of various cargo systems on board vessels, until the development of container cell ships in the 1960s.



Figure 11: Moore-McCormack container (Source: Museum of Docklands, archive box 'Container Images' loc.3.4)



Figure 12: Non-integrated infrastructure (Source: Museum of Docklands, archive box 'Container Images' loc.3.4)

demonstrates the inconsistencies in the attendant infrastructure of cargo handling. Whilst the increasingly homogenised designs of the early containers is apparent, so too is the parallel mechanisation of handling and stowing cargo. However, as with the previous discussion, the notion of mechanised cargo handling was thwarted by a lack: once again, that of systemic compatibility and completeness.

The mechanisation of cargo handling equipment suggests the delegation of effort from human labour to technological forms (an issue developed more fully later in this

chapter). Within cargo handling there have been a number of ‘technological’ developments intended to facilitate the transfer of cargo onto and off vessels, as well as in the hold of the vessel itself. These may take the form of somewhat rudimentary material formations such as the sacking placed around footwear to prevent stevedores from slipping in the hold (No Author, 1952), through to the use of skid boards to facilitate the movement of cargo in the hold (see Figure 13). Again, whilst these ‘devices’ may not exemplify advanced forms of mechanisation they do imply the use of labour-saving devices to *complement* human labour. Although the use of sacking can be seen as late as 1952, forms of mechanised cargo handling were present in the late nineteenth century, with hydraulic cranes seen in photographs from 1888 (No Author, 1888). An advertisement in *PLA Monthly* from 1929 (PLA Monthly, 1929) depicts the use of mechanised cargo handling plant (Figure 14), with the case being made that such technologies facilitate ever-faster modes of discharge. Echoing later cultural presumptions concerning the speed of Modernity (Tomlinson, 2007), the sales pitch conflates speed with “modern methods of handling”. Such methods were in place to facilitate and (critically for my argument) *speed up* the process of handling cargo at the dockside and onboard.

Whilst these are exemplars of early methods of mechanised cargo handling, there is one critical aspect that is missing: that of *intermodality*. It is a highly sophisticated, complex and tightly coupled apparatus designed to integrate previously disaggregated transport systems by promoting the continuum of commodity movement from door-to-door. However, even with the move towards unitised cargo and the mechanisation of handling methods, the systems in place were still localised and non-integrated, whereby different methods and procedures existed in parallel. They were fragmented. Pallets still had to be moved from ship to shore, then stored in warehouses before being loaded onto lorries or the rail network. Whilst the development of the early sealed containers offered some

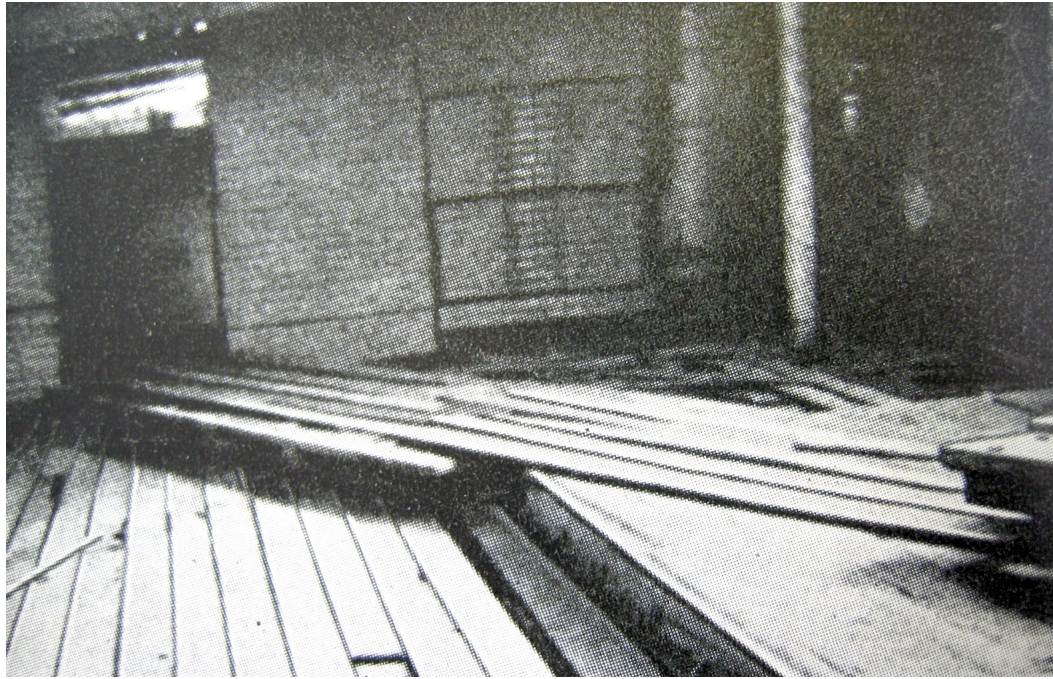


Figure 13: Skid boards in cargo hold (Source: Ford, 1950:280)

MODERN METHODS OF HANDLING



“Simon” Pneumatic
Grain Intake Plant.
Spillers & Bakers Ltd.
Capacity 45 tons
per hour.



“Simon” Floating Pneu-
matic Grain Discharging
Plant at Avonmouth.
Capacity 200 tons
per hour.



No. 2 Granary, Manchester Ship Canal. Erected and equipped by Henry Simon, Ltd.

WE SPECIALISE IN THE DESIGN AND CONSTRUCTION OF ALL TYPES OF HANDLING APPLIANCES. Granaries. Grain Storage and Handling Plant. Pneumatic and Mechanical Ship Discharging Plant. Warehouse Equipment. Goods Handling Appliances. OUR EXPERIENCE IS UNRIVALLED.

HENRY SIMON LTD., MANCHESTER.

CONVEYING DEPT., CHEADLE HEATH, STOCKPORT.

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Figure 14: ‘Modern Methods of Handling’ advertisement (Source: PLA Monthly, 1929:xii)

solution to this problem, the coupling of the container with the various transports interfaces was still rather rudimentary. Linkage and movement were always overriding aspects of freight transport but the container speeded this process up by reconfiguring

the roles of intermodality and inter-changeability. I will go onto argue that the standardised design of the container offered the means to consolidate earlier approaches and link the spatially disaggregated elements of the commodity chain.

Organisational Logic:

Before we address the impact of intermodal containerisation, this section is intended to locate the logic of mechanisation and organisation within a wider rubric of control. In particular the legacy of Fordist production technologies and the packaging of efficiency will be discussed in terms of a unified *system* of movement. Given the earlier discussion of the relationship between distributive space and post-Fordist, just-in-time management practices, it may appear somewhat counterintuitive to link the development of containerisation to mass-production techniques. In doing so the intention is to argue that an important facet of the container is that it embodies certain spatio-temporal ideologies associated with Fordism (such as standardisation), whilst facilitating an organisational shift in the geographies of the production processes themselves.

According to the social and cultural historian Siegfried Giedion, mechanisation is the creation or imposition of order: the ordering of production, but also of minds and feelings (Giedion, 1948:v). The tenor of such a claim should of course be contextualised in relation to the wider ideology expounded in his work – that of creating the “tools to dominate reality” (Giedion, 1948:14). Such tools, as we will see in this section, consist of the means to dominate the production of manufactured goods, as well as the domination of food production, through to the ability to organise domestic life in the shape of bath design (Giedion, 1948:628-711). Emanating from such propositions is the central notion of organisation, and his work (‘anonymous history’ as he terms it) offers a valuable insight into these various tools of domination and organisation. In this section I attempt to locate the development of the standardised shipping container as just such a ‘tool’: a

systemic mechanism designed to dominate, consolidate and further organise the mobility of trade. In proposing this, I begin to position the container within a lineage relating directly (and indirectly) to the mechanisation of assembly lines, most notably in relation to the development of interchangeable, standardised components. The link between automation and the freight transport industry had already been raised by the McKinsey report (1966:5), when it argued that the technology to fully-automate the industry had been available throughout the twentieth century, however it insists that one of the reasons for this not being adopted was the power of the unions in resisting the move towards full automation due to the resultant loss in labour, as was universally seen in numerous traditional port cities.

The history of mechanisation is of course a broad and complex one, including the early machines of the medieval period (Gimpel, 1977), through the development of the printing press (Eisenstein, 1980), to perhaps the most iconic mechanised process of all, that of the Ford Motor Company production line, developed by Ford in Highlands Park in 1913 (Hounshell, 1984:10). Although the automobile was to become the epitome of mass-production and its attendant socio-cultural impact (Giedion, 1948:43) the role of mechanisation reaches back to earlier production processes such as the cotton mills of Lancashire in the mid-late eighteenth century, but significantly to the work of Oliver Evans and his mechanised grain mill from 1783 (Giedion, 1948:79-86). Evans' design for the grain mill (see Figure 15) illustrates the overarching ideology of the assembly line: that of the "speediest, most nearly frictionless transportation from each fabrication process to the next" (Giedion, 1948:78).³¹ Evans' production line offered a neat summary of the wider process of mechanisation: *the desire to promote continuous flow through the production process without interruption*. The 'flow production' process, as initiated by Evans, provides an

³¹ It should be noted, following Hounshell (1984:11), that there is not a direct connection between Fordist methods of the moving assembly line and Evans' 'flow production' line. As Hounshell notes, Ford insisted that the main influence was that of the advancements in the meatpacking industry.

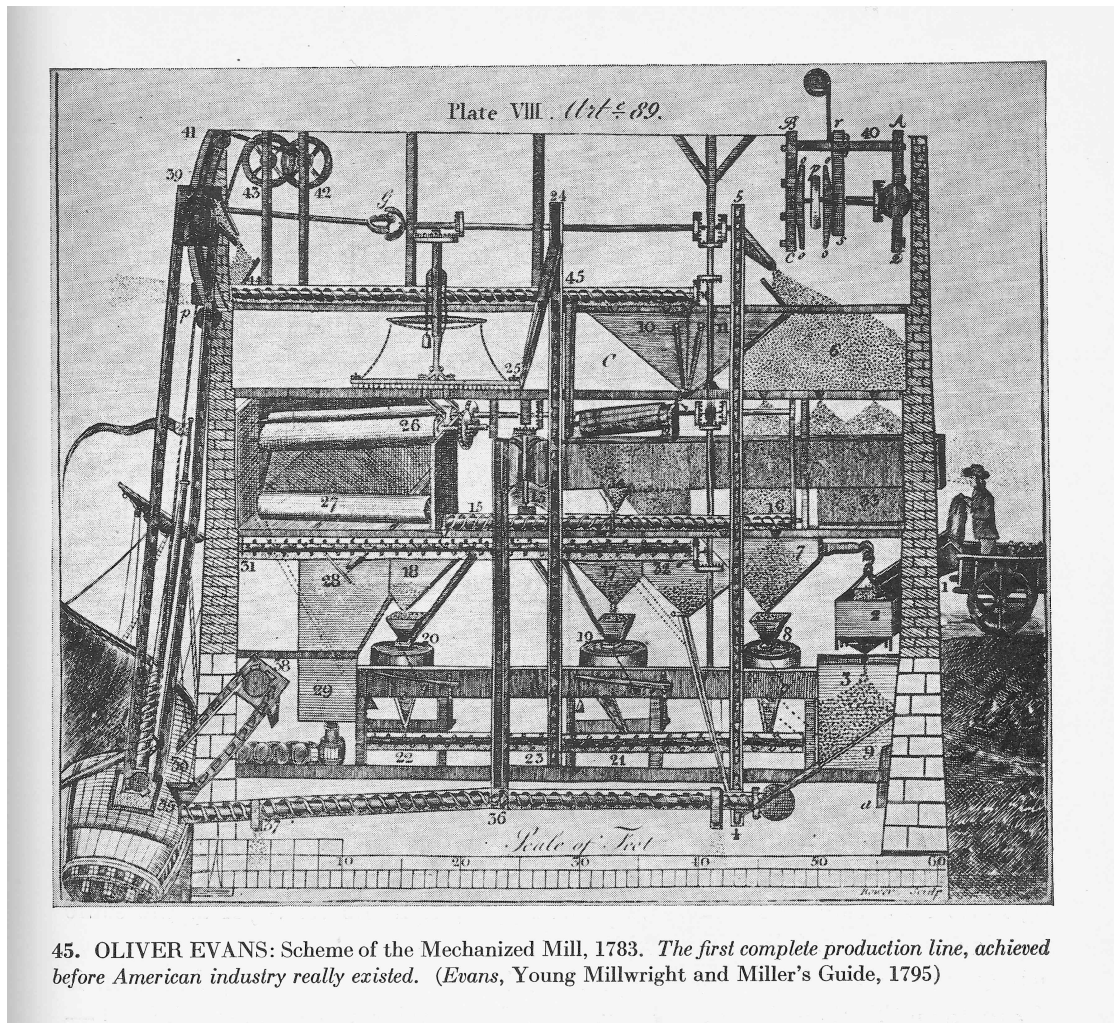


Figure 15: Mechanised mill design (Source: Giedion, 1948:83)

important backdrop both to later procedures utilised by Ford, but also in relation to my positioning of cargo handling as a manifestation of a similar spatio-temporal remit, namely near-frictionless flow. Of significant import to the continuous flow of material in the early production line was the replacement of the human hand by the machine (Giedion, 1948:85). In this situation the hand became mechanised. Whilst its ability to carry out various types of tasks are embodied in the mechanised actions of machinic systems such as Evans' grain mill, the hand, according to Giedion, is incapable of one significant action: that of continuous activity and *repetition* (Giedion, 1948:47).

One of the clearest articulations of the mechanised actions of the hand, and repetition in particular, is the work of scientific management and that of Frederick W.

Taylor. Whilst widely disseminated (see for example Bahnisch, 2000; Cresswell, 2006:85-121; Hounshell, 1984:249-253) it is important to outline some of the fundamental characteristics of this discipline in relation to the argument concerning the mechanisation of movement. Scientific management was effectively a system to manage mobility (Cresswell, 2006:87). Crucially this was achieved through the *systematisation* and *standardisation* of the body, where the movements of the worker-body were organised into a supposedly repeatable formula that would provide the most efficient employment of the worker (Bahnisch, 2000:62). The intention was to eliminate the wasted movements of the body and thus (as outlined in the previous section on stowage) wasted time. Bahnisch suggests that this was to create order “where disorder threatened” (Bahnisch, 2000:64). This was achieved in part by the regularisation of movement, evinced by the standardisation of the various movements of the body. The notion of standardising the body is a telling one, for it identifies the wider ideological underpinning of such a belief: that of eliminating the irrational forces of the subjective worker, foregoing the potential initiative of the worker and promoting the “automatization” of the worker (Giedion, 1948:99). The intention of such an approach was to systematically denude the inefficiencies of human labour through the conscription of the human body to the machinic impulse. Indeed this is exactly Taylor’s assertion that the solution to the wider conception of social inefficiency “lies in systematic management, rather than in searching for some unusual or extraordinary man” (Taylor, 1911:7). In other words, through standardising it.

In theory the machine has the ‘ability’ to repeat tasks without difference: the flow of materials through the system can be repeated endlessly with the ‘surety’ that the movements of the machine are identical to the last.³² Crucially the means to control the

³² The use of inverted commas is intended to reflect Deleuze’s notion of repetition: critically, “Repetition can always be “represented” as extreme resemblance or perfect equivalence, but the fact that one can pass by degrees from one thing to another does not prevent their being

interactions of the various parts of the system (minus the ‘inconsistencies’ of human labour) is evident in the drive towards full automation. The exclusion of human labour, in favour of the machine, is in tandem with the desire to move from an atomised notion of individual items of cargo towards the *flow* of cargo en masse. Perhaps the most useful illustration of this early process comes from an offspring of Evans’ grain mill: that of the Chicago-based automated grain mills of the late 1840s. The case of grain movement is useful in that it demonstrates the importance of how commodities are viewed in metaphorical and material terms. This line of reasoning is intended to reflect the earlier discussion of Pye’s work on ‘shape determining systems’, so that the overarching shape given to the system organises the system itself. Indeed the move towards full-scale containerisation of cargo owes a great deal to how bulk cargoes, such as oil, were viewed as homogenous (McKinsey & Co., 1967:5). Cronon’s (1991:111-113) dissection of the Chicago grain elevators echoes much of what I have discussed above, especially in terms of the initial reliance on individual items of grain sacks; the realisation on the part of grain suppliers that this system was systemically inefficient;³³ and the subsequent development of a system that automated and accelerated the entire process by homogenising grain into an almost liquid-like entity (Cronon, 1991:145). Instead of grain sacks being carried by workers, the grain elevator (developed by Joseph Dart in 1842 (Cronon, 1991:111)) facilitated the automation of grain movement within the building. Whilst the specific architectural details are not crucial here, the systemic cohesion and completeness is. Of decisive import to this system was the partial elimination of human labour—for the automation of grain movement involved the employment of conveyor belts to bring the grain in. Buckets would transport the grain to the top of the building, where it was weighed, before being directed into the specific storage bins. Then, “once it

different in kind” (Deleuze, 2004:2). However, as we saw in *Interlude I* with Pye’s example of the printing press there is an inevitable presence of error. The inherent lack of permanent stability is dealt with in *Part Two*.

³³ Cronon’s argument concerns the competition between Chicago and St. Louis, the latter of which fell behind the former when it introduced the automated grain elevators.

was inside the bins, workers could deliver grain to a waiting ship or railroad car simply by opening a chute at the bottom of the building and letting gravity do the rest of the work” (Cronon, 1991:111). The role of the grain chute is an interesting one as it offers a continuous, homogeneous surface for movement, as opposed to the fragmented movements of individualised sacks. As such, the chute seems to represent a bounded conduit or channel, echoing perhaps the later manifestations of cargo movement through ‘channels’ (we will return to this in *Chapter Two*). As with Evans’ example, the determining factor in the grain elevator was the construction of an automated system (minus extensive human labour), resulting in the continuous flow of grain through the space; the organisation, temporal scheduling and integration of operations; and finally the designation of the system as a single, functioning totality. There is however an addendum to this: all of these criteria are determined by the system being *in relation*. The flow of grain through the elevator does so in order to for it to integrate as efficiently and quickly as possible with ships or trains. And whilst the organisational logic of pre-containerised cargo handling and movement is obviously determined by the relation between differing spatial and temporal aspects of the system there is perhaps a decisive difference – that of efficient integration of relations through the promotion of a complete, interchangeable system.

Where does this leave the debate? Much of the previous discussion has centred on a variety of issues: repetition; inter-changeability; stabilisation; completeness and standardisation. In part these attest to the move from localised forms of engagement to universalised, totalised forms of control. But as we saw above, the problem of a localised approach to cargo handling was still pervasive even with the mechanisation of a number of processes. Perhaps the decisive rejoinder between the earlier outline of the move toward mechanised cargo handling, the mechanisation and automation of production line processes, and the previous discussion of temporality and organisational completeness is

the quote from Prigogine and Stengers (1984:50) in *Interlude I* concerning the development of *devices* which can harness the forces of nature. It is to the wider notion of just such a material ‘device’ that I now turn, the fully standardised, intermodal container.

The Intermodal ISO Container:

As already articulated in the introduction to this chapter the standardised shipping container was seen to offer a comprehensive set of benefits to the shipping and freight transport industries, notably in terms of increased productivity and cost reductions. The economic imperative seemed clear. The uniformity of shape and size

“provided maximum internal space, maximum volume given the maximum width dictated by the physical and legal limits of road and rail traffic, and minimum waste of space in loading containers aboard ship or parking them ashore, both horizontally and vertically” (Broeze, 2002:12).

The maximisation of spatial efficiency was decisive in terms of the economic benefits. Further to this, as argued in the previous sections the intermodal container was seen to overcome the fragmentation of the freight industry. As Broeze also suggests: “the use of such standardised units [created] an effective multi-modal sea-and-land system with door-to-door transport from producer to consumer” (Broeze, 2002:9). Obviously the standardised container, along with its attendant material infrastructure, has been a significant part of intermodalism’s development (or multi-modalism as it also known) in making it commercially feasible to deliver goods door-to-door (Talley, 2000:933-934).

The development of the standardised shipping container is rather complex – its story is not one of immediate global impact, but rather an incremental, almost stuttering emergence over an extended period, beginning in the mid-1950s and only reaching global hegemony in the late 1970s. We saw in Figures 11 & 12 how the standardised design of the intermodal container was evident, but the infrastructure was not. The critical importance of this perceivably ‘mute’ object lies with its intermodality: that is, its ability

to transcend the divergences between land and sea through the development of an internationally recognised and standardised infrastructure. The historical development of the container, whilst not widely disseminated (see Teräs, 2007:138), has recently garnered a certain amount of attention from within the academic community (Broeze, 2002; Cudahy, 2006; Hunter, 1993; Levinson, 2006. Also see Jackson, 1983:154-155). Given that such studies have posited the historical development of the standardised container this section does not attempt to trace the in-depth details of its emergence. Rather, I aim to situate the development of the container within the wider scope of spatio-temporal completeness. In doing so the rationale is to consider the specific notion of standardisation as a mode of ordering and stabilisation.

That said, before addressing the wider remit of standardisation and stabilisation it is necessary to offer a partial history of the object itself, for the narrative points to the rather turbulent attempts to institute a global system of trade movement. What exemplified the early examples of containerised cargo was the lack of an integrated system of control over their movements. According to Broeze (2002:9) the key factor that would afford integration was the *standardisation* of the design of the container so that a globally recognised design could be developed. Without the development of a fully interchangeable container design the economic imperative of containerisation as a totalised system was limited. However, the move towards a fully standardised container was rather fraught. Levinson's (2006) rigorous outline of the development of the standardised container offers a detailed account of the move towards standardisation, superseding other testimonies which tend to take the notion of standardisation as a given – for Levinson this is central to the dominance of the container.

It is widely recognised that the individual responsible for the early development of the shipping container was the U.S. truck operator Malcom McLean (see Levinson, 2006:36-53). In 1953 McLean developed the idea of transporting truck trailers on ships

rather than on the congested highways of the U.S.'s east coast. His rationale was to overcome the congestion by consolidating the transport system: at this time the truck and ship industries were entirely separate (Levinson, 2006:43). There were, however, limitations to such a proposal, most notably, the inefficiency of transporting truck trailers with their wheels attached. Like the stowage of barrels, the irregular shape of the truck trailers meant that space was wasted under the trailer chassis. If the trailer wheels were removed spatial wastage would be eliminated, and perhaps more fundamentally it also meant that the "trailer bodies could be stacked" (Levinson, 2006:47). This was a crucial development, but one that, in essence, did not differ profoundly from the earlier processes of unitisation outlined above. The key was the recognition, on the part of McLean, that the system as a *whole* needed to be reconfigured and reorganised to enable the demounted trailer bodies to be moved across multiple transport networks. McLean's decision to separate the truck trailer and box may not seem significant, but as both Broeze (2002:31-32) and Levinson (2006:53) suggest, this meant that the previous divergence of road, rail and sea networks was finally overcome by the intermodal container.

Employing the container engineer Keith Tantlinger, McLean commissioned him to design a new aluminium container. Added to this, a decommissioned tanker, the *Ideal-X*, was reconfigured to accommodate the new containers, with no other cargo being stowed. Given the previous attempts to foster unitisation, one of the decisive factors in McLean's operation was his realisation that not only would the container itself have to be designed from the outset, so would the resultant infrastructure, including the ship and the system of loading containers (Levinson, 2006:51). Where previously the non-standardised containers were lifted via shipboard winches or dockside cranes using rope, McLean opted to refit two existing cranes, moving them to the ports where the first container-ship journey would be made. Levinson (2006:51) notes that a further piece of equipment

was developed by Tantlinger that enabled the container to be lifted without the need for dockworkers to attach rope. This ‘spreader bar’ meant that “once the box had been lifted and moved, another flip of the switch would disengage the hooks, without a worker on the ground touching the container” (Levinson, 2006:51). Tellingly, we see how the elimination of human labour in this part of the process echoes the wider elimination of human labour in the automation of manufacturing. The effort expended by the dockworker is redirected to technology: this would have a huge impact on labour relations in the shipping industry. The date of 26 April 1956 is significant—it was the first sailing of the *Ideal-X* from Newark to Houston. This was important as it prefigured the momentous shifts that would occur not only throughout the shipping industry, but also across the entire transport infrastructure. Ultimately the success of McLean’s container lay with the realisation that the complete system of transportation had to be reconfigured. This relied upon the standardisation and regularisation of procedures and materials across the industry, thus ensuring systemic compatibility.

This is precisely the area that the McKinsey report argues needed be fully recognised. They suggested that without a standardised design “nonstandard containers by themselves are just another form of unitisation similar to pallets” (McKinsey & Co., 1967:6). The now widely recognised standard sizes of the ‘twenty-foot equivalent’ (or TEU) shipping container (8 feet wide, 8 feet high, and 10, 20, 30 or 40 feet long) were only fully agreed as late as 1970 by International Organization for Standardization (ISO) (Levinson, 2006:148). Although the initial sizes were agreed in 1961 (Egyedi, 2001:49; Levinson, 2006:137) it was only after 1966 that various interested parties in the shipping industry began to compromise. Vital to structural integration was the standardised nature of infrastructure, enabling the coupling of the container with a variety of nodes. These included significant technical developments, such as container-cell ships designed to accommodate containers in specially designed cell bays on the vessels (Pinder & Slack,

2004:3); the redesign of road haulage vehicles and railway rolling stock; the design of container handling vehicles in ports; the construction of large-scale dockside gantry cranes (No Author, 1970); the design of spreader bars (Levinson, 2006:51); and, crucially for my own argument, the design of the container corner fittings. Everything had to be effectively designed from scratch.

Approved in September 1965 (Levinson, 2006:142), and covered by ISO 1161, the corner fittings (four on top, four on the bottom of the container) consist of an elongated oblong hole on the upper and lower faces, with two shorter oblong holes on each outer-facing corner (see Figure 16). Made of steel, stainless steel or aluminium, their placement on the corner of the container is covered by a standard spacing of 2260mm in width, so that various means of lifting containers can also be standardised across road, rail and sea. Effectively, the corner fitting is a ‘bridging device’ that allows the container to be attached to lifting apparatuses, such as spreader bars or port gantry cranes. Equally, they facilitate a secure fastening to truck trailers, and on board container cell ships where they are locked onto the ship’s loading bar armatures. The issue of affixing is crucial: for a twist-lock mechanism is required to secure the container via the corner fitting through a simple locking device. In contrast to the corner fitting, the twist locks themselves are non-standard designs, and the Health and Safety Executive (Health and Safety Executive, 2008) note that as of 2008 some 46 designs of manual and semi-automatic twist-locks were in use. This, they suggest, has resulted in a lack of systemic transparency, so that the diversity of designs (including left-handed and right-handed mechanisms) has resulted in a lack of safety.³⁴ This apparently mundane design of the corner fitting (and the twist lock) demonstrates how important linkage (both materially and conceptually) is to the intermodal nature of containerisation. Reflecting the unseen power of designed objects in

³⁴ Amongst the variety of twist-lock designs available, there is a mix of manual, semi-automatic (where the lock engages automatically when the container is lowered into position, but has to be manually disengaged), and fully automatic twist-locks (where the process of disengagement is achieved by a slight twist of the container as it is moved by a gantry crane).



Figure 16: Container corner fitting (Source: Photo author's own)

our daily lives (Heskett, 2002; Molotch, 2003; Shove et al, 2007) the corner fitting represents the quintessential characteristics of mundane objects: they remain unnoticed, and as Michael (2003:128) suggests, they actually *mediate* everyday life. In the case of the corner fitting, whilst it may not inflect upon our daily lives in the way that other mundane technologies such as the TV remote control may, it is arguable that the corner fitting is even more powerful in its capacity to facilitate the distribution of commodities per se. Ultimately, the influence of this design lies in its standardised nature.

Standardisation and Delegation:

In this section I turn to the importance of standardisation. The agreement over the standardised design and dimensions of the ISO intermodal container points to the way in which the regularisation of design ensured compatibility across the various transport networks (Gunston, 1968:59). Standardisation in the manufacturing process had been in

existence since the impact of mechanisation and notably in relation to the use of interchangeable machine parts (see Higgins & Hallström, 2007:691), as well as in the manufacture of firearms (DeLanda, 1991:31). In the case of manufacturing, the standardisation and inter-changeability of parts was intended to eradicate limitations in the flows of parts within a production line. Or more broadly,

“the development of technology involves not just the reduction of blockages through the production of technical standards and other mechanisms, but the development of ways of circumventing or reconfiguring existing impediments and ways of establishing new ones” (Barry, 2001:18).

This valuable outline identifies the intricate relationship between the role of standard procedures, standardised materials, and the diminution in impediments to specific circumstances (in our case the packaging of goods in ships’ holds and the flow of goods across various transport platforms). Added to this, standardisation creates a boundary that protects the system of flow itself i.e., a form of completeness, or what I term here the packaging of efficiency. Barry’s work emphasises how standards are concerned with overcoming systemic division through co-ordination, organisational logic, and systemic completeness. Above all, in terms of a Foucauldian reading of governmentality, Higgins and Larner (2010:3-4) locate technological standards within a field “which makes social domains knowable and governable”. Such practices and procedures of governance are intrinsic to the development of global parameters, a case we saw in the *Contextual Introduction* with the increasing power of Transnational Corporations, so that ‘at a distance’ control over specific global processes can be actioned.

Like the grain elevators, the system of containerisation is premised on the co-ordination of *relationality*, i.e., the relations between all of the constituent elements of the system.³⁵ As the corner fitting demonstrates, there has to be a stabilisation of relations,

³⁵ Fuller (2005:94) argues that “each container is self-contained” in terms of the specific content of the container itself. Whilst the container does have such monadic qualities it is the

whereby the linkage between the container and the various modes of transport is 'guaranteed' through the universally recognised design. More pointedly, there is a *stabilisation of change*, where the mobility of the container is guaranteed as it changes across different transport platforms. There has to be a *fit* between them (Star, 1991). The issue of guaranteed fit is an important one in the literature on standardisation. Bowker and Star (2000:13) in their work on classification note that standards are "any set of agreed-upon rules for the production of (textual or material) objects". Brunsson and Jacobsson (2002:15) confirm this by defining standardisation as the *implementation* of agreed-upon rules. The development of the intermodal container exemplifies this: only with the collective agreement on the standardised sizes could the design be fully implemented. There is however another form of guarantee, and that is the one whereby the object itself is governed by internationally recognised standards, guaranteeing the regularity of design and its attendant ability to interact with other material objects, or indeed other standards (see Fabbe-Costes, Jahre, & Rouquet 2006). Through such structures of agreement standardisation embodies the entrenchment of standards so that the various standardised components of a system become "crystallised" (Egyedi, 2001:41), or what I would term stabilised. That is, they are congealed into a working whole, where a boundary is created between those objects that have been agreed-upon, and those that have not.³⁶ Through this process of entrenchment one sees the selection of specific technologies that filter or enrol the standardised system. With containerisation, the corner fitting would be a case in point, in that it facilitates interconnection of specific actors. For Bowker and Star (2000:13) the notion of compatibility highlights a further feature of standards: that is, how "a standard spans more than one community of practice (or site of activity)". This is achieved across both space and time: i.e., standardised objects are able to operate across

interchangeable nature of the standardised design that makes it such an important material example of global exchange, and in this sense might be seen in distinctly Leibnizian terms.

³⁶ This is not to suggest that non-agreed-upon objects always lie outside of such standardised systems, rather that certain levels of improvisation are required in this case.

distance, but also to sustain compatibility and reliability over time. Both aspects of this relationship embody the crux of the intermodal container: it is built on its ability to interchange through the infrastructure of containerisation, and equally the embedded or entrenched nature of the infrastructure ‘guarantees’ the *ongoing* ability to interchange.

This argument concerning standardisation and inter-changeability speaks, principally, to the importance of stabilising interconnection. Latour (1992) reads the various processes of stabilisation (and destabilisation as will become evident in *Part Two* of the thesis) via the concept of delegation. Delegation is a process whereby human effort is delegated to socio-technical machines, be that a washing machine, television remote control (Michael, 2000), or door hinge (in Latour’s case).³⁷ An object may be said to “displace, translate, delegate, or shift” (Latour, 1992:229) its function from one of major effort (opening a heavy door) to a minor one (displacing this into the light push of the door). Through the design of the simple device of the container corner fitting, the previous work, effort and time expended on conjoining the container and vehicle (through the lashing of ropes) is built-into the device: it is *delegated* to it. That is to say the purpose of this device (to link container and vehicle) replaces the previous job of the dockworker.³⁸ In this sense the action of the worker is delegated to the corner fitting and twist-lock mechanism, albeit a mechanism that has to be locked in place by hand in certain cases. Critically, the expenditure of effort in lashing ropes around non-standardised containers is replaced by the “dream of efficient action” (Latour, 1992:235) embodied in the device itself. Likewise it could be argued that the technical know-how and skilled knowledge of stowage that stevedores previously utilised becomes delegated to the container i.e., the ‘shape determining system’ of unitisation alleviates the need for

³⁷ However Latour notes that delegation does not solely move from human to nonhuman. Instead it can be a process of delegation to a “more durable” actor, be they human or nonhuman (Latour, 1992:256 n.6).

³⁸ It is clear from this (and in Latour’s own study (1992)) that delegation is an inherently political process.

the skill-based stowage of cargo.³⁹ However, even with the delegation to technical objects, the process of stabilisation is a relatively lengthy one, in that it takes time for a system of delegation to become entrenched or embedded, as seen with the previous discussion of the negotiations towards standardising the container design.

This process of delegation and the issue of timeframe is pertinent to a further Latourian notion, that of ‘black boxing’ (Latour, 1987a): through its efficiency of operation the background work that enabled the delegation to occur in the first place can be ‘packaged’ (Law, 2004:33). Described as a “conceptual mainstay in science studies” (Michael, 2000:131) and beyond, black boxing (or packaging (Law, 2004:166 n.27)) refers to the way in which various technologies, scientific practices, as well as objects and ideas become stabilised or ‘taken-for-granted’ due to their efficacy of operation (see Star, 1991). Latour argues that such technical work becomes “*invisible* by its own success”, adding, “when a machine runs efficiently, when a matter of fact is settled, one need focus only on its inputs and outputs and not its internal complexity” (Latour, 1999:304 my emphasis). We do not ignore the object completely but rather acknowledge what it may do for us, rather than *how* it does it. Similarly, Harman’s reading of the black box notes how “by definition, a black box is *low-maintenance*. It is something we rely on as a given” (Harman, 2009:37 emphasis in original). By accepting the operation of the black box ‘as a given’ the link between invisibility and stability becomes evident: black boxes have the capacity to act or perform effectively because we do not feel obliged to question what Harman calls “the massive network of alliances of which it is composed” (Harman, 2009:34). To be sure, in the case of the container the process of stabilisation embodied in devices such as the corner fitting serves to mask or conceal the infrastructure of inter-

³⁹ It should be noted that the packing of containers still requires a knowledge of weight distribution, although this has itself been delegated to computer software packages such as CubeMaster (see http://www.logensolutions.com/VMS/CubeMaster/Cargo_Load_Plan_Optimization_Software_Overview.html). Even with such computational procedures the limitations of human action in terms of container loading will be seen in *Chapter Three* with regard to maritime accidents.

changeability. Overall, the context of packaging or black boxing proves how the ‘shaping of action’ (as discussed in *Interlude I*) is an important aspect, for the box-form of the container *literally* packages the commodity mobilities, whilst the system of containerisation is a larger scale networked black box that itself is a form of package – one that, in the same way as the ISO container, organises mobility through the various mechanisms of standardisation.

Finally, although figured against a different background (that of visualisation and textuality) Latour posits a further combination of mobility and stabilisation in his outline of the ‘immutable mobile’ (Latour, 1990; also see Latour, 1987a). His concept of the immutable mobile refers to the stabilisation of ‘objects’, be they pictures, letters, maps, or material objects more widely, so that they can be facilitated to move. Latour’s example of writing is a telling one. He argues that knowledge itself is produced through the act of inscription, in part because the written word can travel more effectively given that its trace is widely recognisable. In this sense the written word is mobile, as its presence becomes stabilised through the act of inscription. This is a result of the need “to invent objects which have the properties of being *mobile* but also *immutable*, *presentable*, *readable* and *combinable* with one another” (Latour, 1990:26 emphasis in original). From Latour’s statement we can see how the intermodal container adheres to the critical components of the immutable mobile – it is clearly mobile, but equally, stable and combinable with other aspects of the system, such as the rail network, road haulage or shipping. This compares with earlier cargo practices discussed previously, which adhere to the mobile formations but critically lack the immutability of containerisation, most notably in terms of their localised approaches. Hence why Turnbull identifies localised knowledge as “messy” (Turnbull, 1993:317), in that it lacks the ability to be transmitted globally. As a result, for Law the spatiality of the immutable mobile is key, in terms of its networked configuration: “a shape, an object, is stable and singular if it is configured within a stable

set of links with other entities” (Law, 2000:4). Pointedly then, we see how the rationale behind the standardisation of infrastructure within containerisation could be read in just such terms. The stability of the container, alongside its mobility (see Cidell, 2012), is governed by its interconnections with other elements of the infrastructure of containerisation. In effect what is clear from this argument is that the stability of the intermodal container lies with its purported power to *hold relations together*.

Packaged Efficiency at London Thamesport:

Before turning to the wider consolidation of global spatio-temporal control in the next chapter, I end this one with the specific application of ‘holding relations together’ in the context of container movements through the maritime space of London Thamesport. Located on the Isle of Grain, in north Kent, London Thamesport is owned by Hutchison Port Holdings, and is the UK’s only fully automated port (Thamesport, 2005:5). The key area of interest with this port space is the system of container movement, one that utilises a number of the key characteristics already discussed, namely; the promotion of flow through the space with limited interruption; the integration of various nodes within the port-space and beyond; attempts to foster systemic completeness through the realisation of the space as a bounded unit, albeit one that is in relation; the elimination of ‘wasted’ time, movement, and labour through automation; but perhaps most tellingly for the overarching argument, the role of inter-changeability. By this I suggest that the various nodes within the port-space inter-lock through a range of spatio-material devices, including the entrance gates to the port, road layout, automated container stacks, pager system, gantry cranes, corner fittings, twist-locks etc.

London Thamesport, like all container ports and other logistics enclaves such as distribution centres and warehousing (see Easterling, 2005; Moran, 2008; Pawley,

1998:182-188), is striking on a variety of levels, including its sheer scale; the hermetic, decoupled qualities in relation to the surrounding locale; as well as high levels of securitisation. In particular, one is confronted by the manifestation of efficiency, demonstrated most tellingly by the aesthetic qualities of the proliferation of minimalist containers (Sekula, 1996), and the overall “goods-handling aesthetic” (Banham, 1967:232). Given the above discussions, the overarching impression produced by London Thamesport and its working environs is the control of inter-changeability. Due to the nature of the container design one is never privy to the contents of the box, everything is hidden from view to the extent that all that is given to the eye is the spectacle of efficiency. Although clearly premised on the wider linkage with other national and international transport networks the port *appears* to be a closed-system of sorts. Again, there is a decisive quality to this aspect – the apparent autonomy of the space itself disguises the distributed nature of inter-changeability. Such processes demonstrate the implementation of systematised flow, in effect following the historical precedents of Evans’ grain mills and the Chicago grain elevators. Indeed the operational logic of London Thamesport is almost identical to the systemic diagrams developed by the Port of London Authority in the late 1960s in its own proposed developments at Port of Tilbury (Port of London Authority, 1966). Figure 17 illustrates the purported efficiencies of the proposed system at Tilbury, in part through the ‘diagrammatic’ simplification of spatio-temporal complexity (Cf. Mullarkey, 2006:157-186). It is important to assert at this point the power of this spatio-temporal diagramming in terms of the packaging of efficiency described previously. Firstly the image limits human presence, with only the slightest hint of human labour in the form of the shuttle carrier and gantry crane operators. More importantly the image speaks to an organisational logic, of continuous flow; integrated operations; the regulation of time and space; as well as the

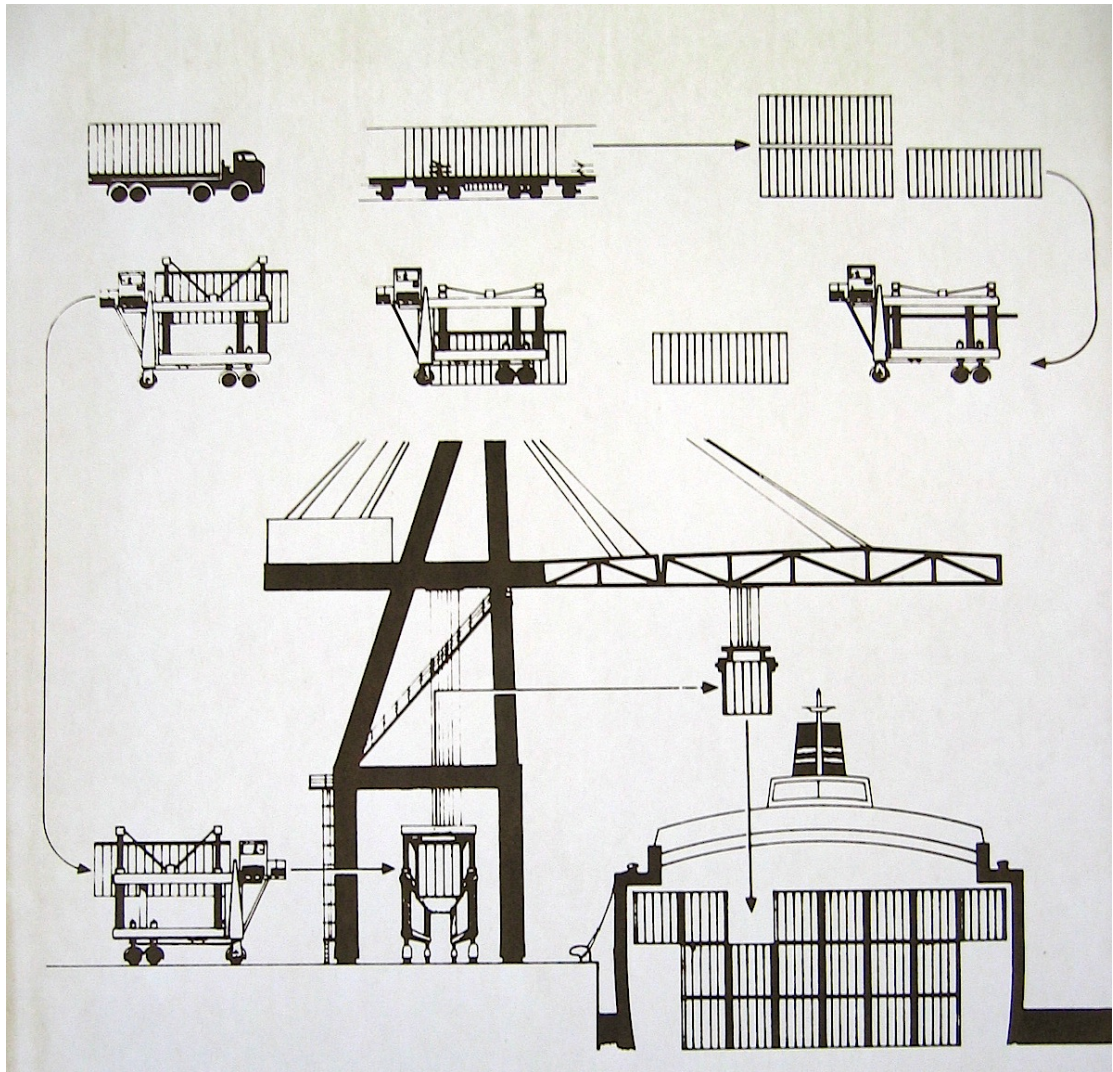


Figure 17: Schematic diagram of container handling at Port of Tilbury, 1966 (Source: Museum of Docklands, archive box 'Container Images' loc.3.4)

image of the system as one complete 'package'.⁴⁰ The organisation of the container throughput appears to depend on the regularisation of the interactions between each point of interchange, so that the complexity of such operations is simplified into an arrow. So whilst Gunston (1968:59) argued that the pre-standardised system was built on incompatibility it is clear from the idealised PLA diagram that compatibility is paramount. Again, we can see a direct link to Cronon's discussion of the continuous flow of grain, viewing it as a fluid entity rather than an atomised individual unit. Although the container itself is still self-evidently an individual unit, its *treatment* testifies to something rather

⁴⁰ In this way the diagram could be linked to the time and motion studies of the Gilbreth's, in that it is a representation of *idealised* movement (see Cresswell, 2006:95-115).

different: that of its inherent relationality. Like oil (or grain) the homogeneity, or the identical quality of every container, affords it inter-changeability.

Both the diagram in question and a further PLA artist's impression of the Port of Tilbury (Figure 18) are strikingly close to London Thamesport. As a system London Thamesport is highly secured; only those lorry drivers with the correct documents are granted entry into the port-space. According to the Logistics Manager at London Thamesport the security system relies on encrypted data, meaning that only a driver with the correct reference number will be able to enter the port space (Ashton, 2007). Once cleared to enter, the driver is provided with a pager that identifies both the driver and the container they are there to either collect or offload.⁴¹ This device is used by the driver to enter the space through a security-gate system, at which point a dedicated printout provides the information as to the location in the automated container stacks, where the container is either to be picked up from or dropped off at. Once this is carried out, for the driver their allotted role within this space is over and they drive off using the pager to exit the system, with an average turnaround time of 35 minutes (Ashton, 2007). Devices like the pager system produce a secured system within the port that attempts, at least, to develop a structure based on the elimination of 'uncertainty', or more prosaically the refusal of entry to those individuals not cleared to enter. Equally it may be read as one of the devices through which the process of inter-changeability is enacted. As with the much earlier Fordist worker (as compared with post-Fordist labour), on entering the system the driver of the truck becomes 'machinic' in their requirement to log into the system, be recognised, catalogued, the truck and container photographed, and carry out the simplest of tasks – to follow a pre-determined path from security gate to the

⁴¹ In relation to Thrift's description of second-wave paratextual forces, at London Thamesport they use a computerised Customs clearance system called Destin8 (Ashton, 2007; MCP, 2011). This is a port community system that consolidates a variety of Customs clearance functions, allowing shippers and port operators to view cargo information in real time. It is used at a range of UK ports including Felixstowe, Liverpool, Grangemouth, amongst others.

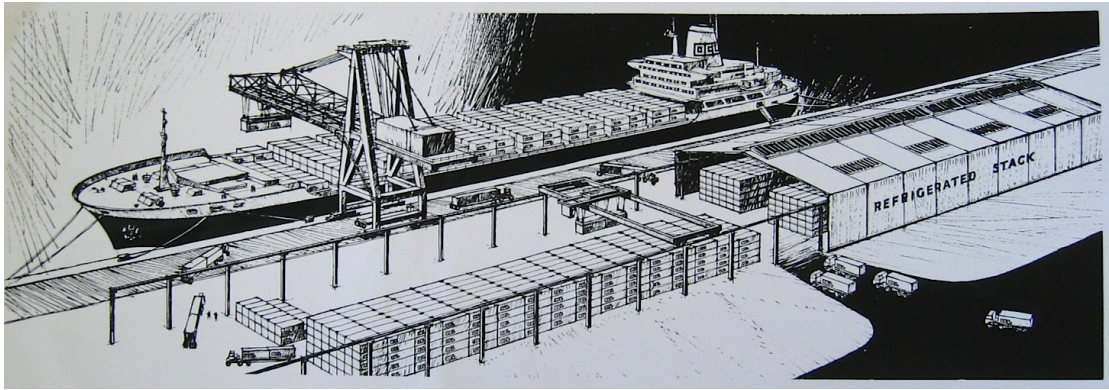


Figure 18: Artist's 'impression' of Port of Tilbury (Source: Museum of Docklands, archive box 'Container Images' loc.3.4)

container stacks.⁴² In keeping with the diagrammatic ordering of the PLA system the route through the port space at Thamesport is premised on the speed of transfer, with Ashton pointing out: “when we call a driver in, we want him in, serviced and out” (Ashton, 2007). Mirroring the arguments in favour of containerisation raised by McKinsey & Co., the rationale for such an approach is identified by Ashton as being economically driven. To facilitate the speed of movement through the port, the driver—in possession of the paper printout—moves past the Customs weigh station where they may be required to stop. Next to this is the Customs x-ray area. If necessary,

“Customs will call for a series of containers. We will bring them up here [...] The [x-ray] boom comes out and it will go across the top of the container. What it will do then, is slowly drive down the rack of containers. It takes about four minutes to x-ray a container and about 15 minutes for the images to be produced. But from that, once the computer's created an image, it gives them a near-3D perspective of what's inside” (Ashton, 2007).

Following this, the lorry follows the route around the port perimeter where they will then reverse into the allocated container stack (see Figure 19). At this point we see a further example of the interlocking between various material devices, with the procedure for transferring containers from the automated container stacks to the trucks carried out through the quickest means possible:

⁴² As outlined at the beginning of this chapter the impact of such processes on maritime labour has been extensive, reducing the workforce at ports throughout the world (see Bonacich & Wilson, 2008:15-22).



Figure 19: Loading bay at London Thamesport (Source: Photo author's own)

“So what the driver will do, on this paper printout it'll tell him which stack he needs to go to, like this one is H. So the driver will [...] back into the one of four available bays. The driver then jumps out and goes to one of these little blue and grey boxes, again, puts his pager in a little holder. And that notifies the system that he's arrived at the bay. That will then task the crane, to go and locate the container” (Ashton, 2007).

Echoing the automation of mass-production the automated ‘rail mounted gantry’ crane (RMG) functions without an operator. The RMG’s role is to locate the specified container that the lorry driver is there to collect: “even if it is at the bottom, it will move the containers around it to get it moved” (Ashton, 2007). At this point the interchangeability between container stack and the lorry is decisive. However, the purported systemic efficiencies are somewhat slowed by the spectre of inefficiency, due, in part, to the impact of human error. When the RMG brings the specified container to the parking bay it has to be manually overridden so that a dockworker can guide the container onto

the truck trailer using a handheld control unit. The reason for such a manoeuvre is telling. According to Ashton, “we can’t guarantee that the lorry is going to back in exactly where we want it to. So we just have a guy with a handheld device who brings it down, positions it onto the four pins on the back of the trailer” (Ashton, 2007). Mirroring my previous use of the term ‘guarantee’ in relation to standardisation, Ashton’s observations concerning the impact of human error could be read in terms of the earlier ideology of scientific management: to eliminate the inconsistencies of the hand. At London Thamesport this is the most obvious example of the incompatibility of human labour and automated processes. In effect, through the incompatibility of the lorry’s positioning and the sway of the container as it is lowered from the RMG, we see a minor de-stabilisation of systemic efficiency resulting in wasted time.

So as to alleviate further temporal inefficiency the RMG returns to its automatic mode. This is critical if the lorry driver is also picking up an import after having dropped off an export container:

“In each stack we have a mixture of both import and export containers, we don’t have four stacks for import with three for export, [as] what happens invariably, is if a lorry is bringing down an export container, 9 times out of 10, he will also pick up an import at the same time. So, once his import container ... once he books in at drivers reception we’ll ask the driver what he’s down for, he’ll say “Oh I’m dropping this export off, I’m picking up this import container.” So what we’ll do then, we will look at the stacks to see where his import container is and we’ll make sure that the data that we upload to his pager stipulates that that one services both routes. So he doesn’t need to leave the export and then come all the way up to H-stack to get his import one. We’ll look where his import is and we’ll make sure that crane takes his export off as well. Therefore, reducing messing him about ... messing about by the drivers and extra, you know, work for our cranes” (Ashton, 2007).

This lengthy outline perhaps exemplifies the attempts to pre-determine the most efficient organisation within the port-space, both to minimise RMG movements but equally to reduce the length of time the lorry driver stays in port – once again, “we want him in, serviced and out” (Ashton, 2007). In the situation where a container is being imported

and discharged from the vessel, the system almost operates in reverse, whereby the internal movement vehicle will load the discharged container into the container stacks, before it is either picked up by lorry or delivered via the rail network terminal at London Thamesport. The speed of this aspect of the process is telling, due to the partial automation of the loading/discharge. Where, as previously described, a dockworker has to guide containers onto or off lorries, the operator of the internal movement vehicle can take control of the RMG from inside their cabs, thus reducing the transfer time.

We see from the description of the container stacks that the pre-planning and scheduling of movement is a decisive factor in the spatio-temporal organisation of the port. Ashton, for example, goes on to discuss the arrangement of stacks, enabling the quickest mode of interchange between either the lorries delivering or collecting containers or the container ships themselves. He notes that the container stacks are

“basically like ... like a big, open warehouse, it’s just like a very sophisticated warehouse and rather than pallets of beans or whatever, it’s 40ftx20ft containers. [...] Containers for external road hauliers are serviced at one end of the port. All of our containers that we need to move to and from vessels are serviced at the other end of the port” (Ashton, 2007).

As such the spatial configuration of the port-space is determined by the need to develop the most efficient through-movement of containers, be it those being imported or exported. Once a container is, for example, to be loaded onto an awaiting container vessel the internal movement vehicles (Figure 20) move the container from the stack to the gantry crane ready for it to be loaded onto the vessel (or the reverse for import).

In this case, the organisation of the container movement between ship and shore—the decisive moment of transfer—depends on the ‘guaranteed’ interactions between each point of connection. The gantry-crane spreader bar (shown above the container in Figure 20) is lowered into place by the gantry-crane operator and automatically locks onto the top of the container (through the twist locks), enabling the box to be hauled onto the vessel. Although the wider issue of vessel speed is a key



Figure 20: Internal movement vehicle (Source: Photo author's own)

question in the ongoing debates on logistics,⁴³ the typical speed of individual container transfer between the dockside and the container cells on the ship takes approximately one and a half minutes (Martin, 2007). When compared with the laborious and time-consuming processes of loading and discharging cargo prior to containerisation, the differences are striking. Figures 17 & 20 speak to the assumed systemic efficiencies of containerisation more broadly, but specifically this stilled moment highlights the infrastructural power of the critical moments of linkage. These appear almost negligible in the image. Whilst cognisant of the implied representational flattening, it is rather telling that the movement from shore to ship is now a seemingly smooth, arced trajectory.

⁴³ For example, Paché (2007) argues in favour of slowness in the logistics chain, thus mirroring the move by the shipping company Maersk to reduce its vessel speeds in order to reduce costs and emissions following the 2008 global recession (see Rosenthal, 2010).

Conclusions:

Although the last section was a partial simplification of the complexity of the day-to-day workings of the port, my key assertion with such an example from London Thamesport is that even at this relatively small scale the organisation, regulation and attempted stabilisation of the container movement process is in evidence. Such processes at London Thamesport, as with all other container ports, are intended to facilitate the quickest turnaround speeds as possible.⁴⁴ Cowen confirms this by pointing out that logistics management (an area we will turn to next) is tasked with “annihilating minutes or even seconds from transactions along supply chains” (Cowen, 2010a:602).

The means to achieve such saving of time has been an implicit focus of this chapter. Whilst the considerable cultural, social, geographical, economic and labour changes instituted by the global acceptance of containerisation have been profound, it is clear from the arguments raised here that there is a distinct lineage in place. One where the increasing drive to create the most efficient movement of cargo can be situated alongside the previous spatial organisation of cargo holds. The packaging of efficiency is not solely a product of the late-twentieth century embrace of containerisation but rather is imbued within the earlier systems of spatio-temporal ordering. As the section on pre-containerisation suggested there was recognition of the inconsistencies of cargo shape and form, necessitating the need for strategies, such as dunnage, to regularise the load, both for the purposes of stowage and to stabilise the load during sail. Perhaps the key debate throughout the chapter has been the question of regularisation, homogenisation and unitisation. Where the spatial inconsistencies of break-bulk cargo were evident, the early processes of unitisation in the form of pallets and packing crates represent attempts

⁴⁴ Although London Thamesport plays an important part in global flows of containerised freight, the power of global hub ports such as Singapore is immense. Whilst the ICT infrastructure is decisive in facilitating the efficiency of the port of Singapore, Airriess (2001:240) also notes the role of the “developmental state” in terms of state-sponsored investment in transport infrastructure. Such forms of economic and political investment in Singapore in the 1990s could be said to mirror the earlier drive by the UK government to invest in containerisation.

to formalise and regularise inconsistencies. This is then developed further by the introduction of fully sealed containers. The benefits of such material strategies were evident to see, including the protection of cargo from damage or theft; the cubic efficiency of the container; increased speed of loading and discharge; reduction in labour costs; and the ability to interchange between different forms of transport. The final benefit highlights the obvious kinship between these early sealed containers and the later fully-standardised ISO units. As a result it is possible to suggest that non-standardised containers (and perhaps pallets before them) represent a form of local stability, whereby the uniformity and regularisation of cargo enabled partial forms of inter-changeability. However, they lacked *global* stability and inter-changeability. A similar argument can be made in relation to the broader infrastructural developments in the mechanisation of cargo handling. Whilst the mechanisation and partial automation of specific handling practices (such as forklift trucks) posits the increasing will to alleviate ‘wasted’ time and manpower, the relationship between handling procedures and cargo items was still relatively fragmented. This is exemplified by the incongruity of fully standardised containers being loaded onto non-standardised lorry trailers using rope (seen in Figure 12).

As suggested in the section ‘Organisational Logic’, what continues to epitomise the ideology of intermodal containerisation is the role of *completeness* i.e., systemic control across the entire freight transport infrastructure (as will be discussed further in the next chapter). By identifying this approach the intention was to posit the potential link between the overarching ideology of modes of ordering and the ethos of containerisation: that is, how relative space-time is deemed governable through standardisation. We saw for example, the organisation and integration of operations at London Thamesport as a single package, read through the diagrammatic rendering of space-time. Importantly for this reading, standardisation demonstrates both discursive

and material formations: the agreed-upon ‘codes’ of a system, but equally the implementation of such codes in the design of both the container, as well as the attendant infrastructure, an argument unpacked more thoroughly in the next chapter. One further means of positing the impact of standardisation was to situate the container within the discourse on stabilisation, most obviously within Latour’s positioning of the immutable mobile as a stable entity that is afforded mobility through stability – as I suggested, perhaps the decisive material manifestation of this is the container corner fitting. Enabling the coupling of immutable mobiles the corner fitting may be seen as a material and metaphorical expression of how completeness is distributed throughout a system, manifested in a seemingly mundane piece of design.

Chapter Two:

Extending Global Interconnectivity: Logistical Power, Infrastructural Control and

Contained Continuity

Introduction:

“The container links land and sea transport in an almost seamless and profoundly international continuum” (Broeze, 2002:5)

“The container system of freight now covers the face of the earth” (Gunston, 1968:59)

To begin to unpack the consequences of containerisation for the wider reconfiguration of spatio-temporal modes of ordering, as well as the implications for maritime workers, it is necessary to briefly return to a historical moment in the geographies of maritime ports: that of the Port of London and the implications of containerisation for its operations. Some ten years after the publication of the McKinsey reports the Port of London Authority (PLA) was arguing for the need to adopt full-scale containerisation. The rationale for such a move reflected many of the arguments raised in the McKinsey reports. The PLA’s *Five Year Strategic Plan 1979-83* noted that, “the most significant changes to affect ports have been the advent of containers and container ships” (Port of London Authority, 1979:1). The issues of mechanisation and unitisation of cargo were central to the PLA’s determination to develop new port facilities, and in particular they argued that mechanisation provided the grounds to radically reduce manpower, noting that as a result of the move towards automation “labour intensive services of the past” were no longer required (Port of London Authority, 1979:12). The PLA stated that this trend was demonstrated by the actual changes in manpower at the Port of London: where 8,100 people were employed in 1979, this compared with 24,264 in 1966 (Port of London Authority, 1979:13).⁴⁵

⁴⁵ For discussion of labour disputes in the US as a result of containerisation see Herod (1998).

Whilst this figure clearly articulates the immense impact of containerisation on maritime labour and thus its wider cultural heritage,⁴⁶ there were other significant structural/spatial alterations. By no means underplaying the social and cultural effects of such changes to maritime labour, the spatial implications concern us here. To implement full-scale containerisation within the Port of London the only possible way was to move the main operations out of the Pool of London to Tilbury on the Essex coast, a move that was recognised as early as 1966 (Port of London Authority, 1966). One of the main drivers for such a move was said to be the lack of deep-water berthing facilities, a key requirement of the increased size of container ships (Joint Port Trade Unions' Committee, 1979:10; also see Port of London Authority, 1966:14). Added to this the systemic and infrastructural impact of containerisation (economies of scale in particular), also reflected the need to substantially increase the size of port facilities. In direct reference to the development at Tilbury, Reyner Banham (1967:231) noted that the scale of the development was overwhelming, with its vast "acreage of flat tarmac or concrete".⁴⁷ The location of containerised port facilities was also a decisive factor in developing integrated feeder services. Identified in the first McKinsey report (1966), feeder services were claimed to enable fully integrated, intermodal land-sea operations, where the increasing size of container ships would mean that 'feeder services' in the form of smaller container ships, railway rolling stock or road vehicles, would forward containers from the port spaces onto inland distribution centres. This is seen in Figure 21 where the consolidation of the previously disconnected transport networks is demonstrated by the reconfigured networked interconnectivity of intermodalism. The

⁴⁶ Headlines prior to this time in *The Port* (1967) (the newspaper associated with The Port of London) noted the impact containerisation could potentially have on staffing levels. At the same time an unofficial newspaper, *The Dockworker*, made the case that the development of such a system would lead to (and indeed did result in) massive redundancies for dockworkers at the Port of London (*The Dockworker*, 1967:1).

⁴⁷ In the early 1970s the PLA proposed to develop a new sea and airport facility at Maplin Sands on the Essex coast. The rationale for such a project was to facilitate the berthing of even greater size vessels (Port of London Authority, 1971:12).

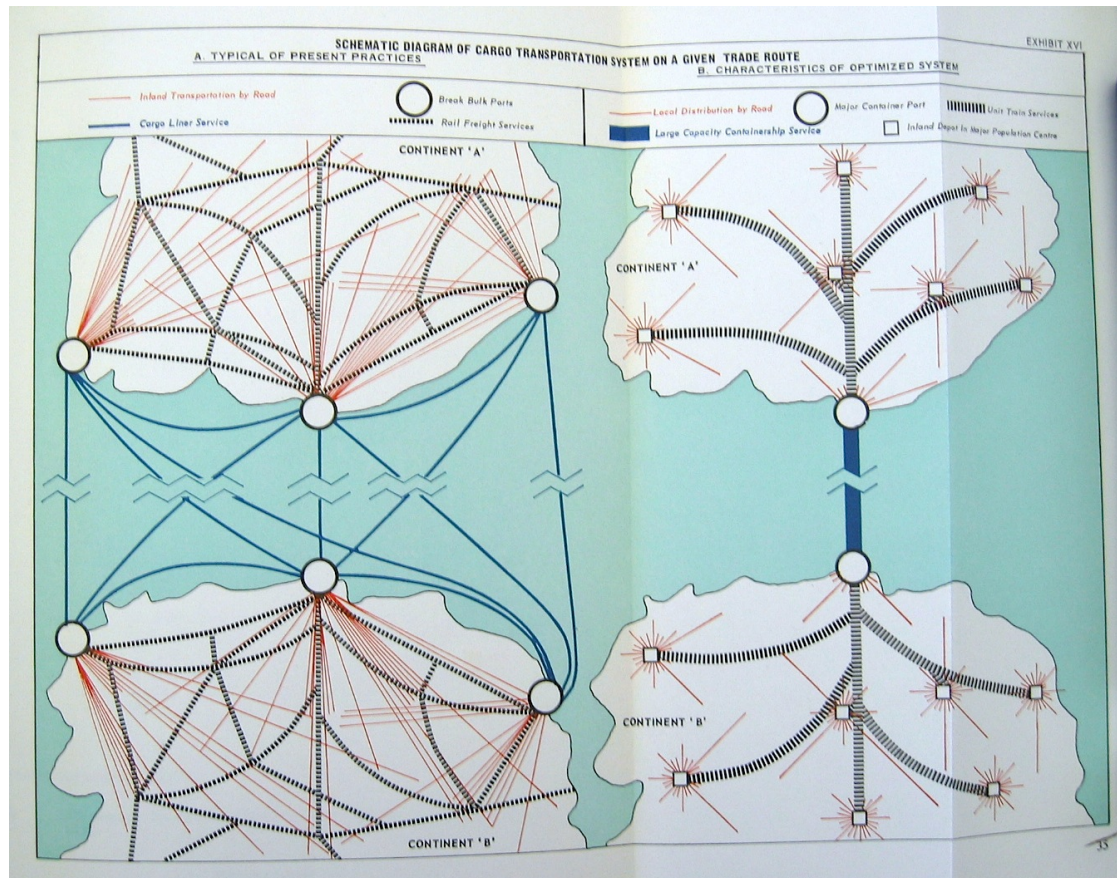


Figure 21: 'Schematic diagram of cargo transportation system on a given trade route' (Source: McKinsey & Co., 1967:35)

process of spatial consolidation is a telling one, as it implies the simplification of the network itself, with greater emphasis on the single maritime link between the two continents. As we shall see below, the increased significance of the regional nodes (distribution centres and warehousing for example) provides an interesting paradox concerning the securitisation of these strategic sites. Such spatial reconfigurations were a significant aspect of containerisation, as it represented the rationalisation of the total freight industry through the integration of various transport networks in an attempt to provide the dreamed-of 'door-to-door' intermodal service. It was noted for example that, "whereas currently ships tend to go where the cargo is, in the future, containers, and not ships, will do this. Thus containers can be looked upon as an extension of, or satellite to, their parent ships" (McKinsey & Co., 1966:12).

This provides an important focal point for the paradigm shift that the intermodal container would institute. For the overarching implication was that the geographies of transport routes would be fundamentally realigned by the container and containerisation, with feeder services enabling containers to be delivered directly to customers. The onward movement of the container would be determined by the distance the container had to travel. For shorter sea routes it was suggested that smaller container ships were most effective. Land routes over 200 miles would be fed by rail, and land routes below this were to utilise road haulage facilities (McKinsey & Co., 1966:14). As a result, the later McKinsey report argued that the logic of unitisation seen with containerisation must be fully implemented across port facilities, the shipping industry, rail, and road transport (McKinsey & Co., 1967:9-26). The networked configuration of the transport routes was deemed decisive to the success of intermodal containerisation. The consolidation of the various transport networks may be said to mirror the reconfigured organisational structure described in the previous chapter. But it also extends the global *reach* of the previously disaggregated transport networks.

In moving operations to the Port of Tilbury the PLA recognised that the logic of unitisation and systematisation would pervade not only the maritime shipping industry, but also the entire transport infrastructure of intermodalism, including rail and road networks. So whilst issues of infrastructure were briefly dealt with in the last chapter, if we look to Figure 22 we can see that the reconfiguration of the wider transport links with the Port of Tilbury were emphasised by its interrelatedness with the soon to be fully-opened London orbital motorway, the M25. With a network-focused approach to intermodality, containers offloaded at Tilbury could be quickly distributed nationally through the new road (or rail) networks. Structurally, this highlights the growing consolidation of the freight industry as a whole and the need for a reconfigured spatial logic of interconnectivity (Easterling, 1999b; Graham, 2001). As we shall see in the

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Figure 22: PLA advertisement (Source: Port of London Authority, 1984:76)

following sections, it is precisely such spatial and temporal reconfigurations that have provided containerisation with its hegemonic success, principally through the *integration* of

land and sea transport by making the through-flow of containers as continuous as possible. Where customarily the disjointed nature of the transport industry meant that individual companies were only responsible for one aspect of a journey, the intermodal qualities of containerisation necessitated and resulted in the consolidation of both the industry but also of responsibility for the movement of individual containers, often under a single bill of lading. As a result “the various types of carriers had to cooperate in order to provide continuous, seamless, reliable freight movement” (Bonacich and Wilson, 2008:54). In the United States, for example, Talley (2000:941) argues that the impact of containerisation, including the scaling-up of container ports, meant that shippers no longer had to import goods according to their geographical proximity to their final destination (also see Bonacich and Wilson, 2008:57). The interconnectedness of containerisation resulted in shippers being able to import goods to the most cost-effective container ports (usually the larger-scale operations), before delivering goods via rail or road hauliers. So, “by choosing the same port as their load center, shipping lines could make arrangements with inland carriers for relatively inexpensive service to and from the port” (Talley, 2000:941).

The interconnectedness implicit to containerisation, and the consolidation of the transport industry, also necessitated a change in viewpoint towards the idea of systemic control. As we saw in the *Contextual Introduction* the logic of systemic control meant that the distributive phase of commodity mobilities accounted for only one aspect of the commodity chain, with the production and retail sectors making up the remainder of the chain. Added to this, for those companies involved in transportation there was competitive advantage to offer a further level of service above and beyond the shipment of goods (Shashikumar and Schatz, 2000:5), a role that would now encompass “documentation, cargo clearance, warehousing, product assembly, and distribution” (Bonacich & Wilson, 2008:55). In other words, they moved from transportation

specialists to a much broader conception of controlling the entire system of commodity movement: they were now logistics and supply chain operators (see Coulter, 2002). Such reconfigurations of the freight industry were not simply a result of the structural changes produced by containerisation: what post-Fordism and the spatialisation of consumer capitalism under the guise of JIT instituted was an important, if at times paradoxical, relationship between control and flexibility. The argument pursued here concerns the issue of relationality, but more fundamentally extending control of interrelations.

The argument develops as follows. In the first section commercial logistics is situated in relation to its military forebear. Doing so illustrates how the core aspect to both forms of logistical practice is the means to *mobilise power*. In the case of military power this is encompassed by the movement, supply and maintenance of personnel, weaponry, and other resources. Historically such power was manifested through the development of physical infrastructure in the form of well-maintained roads, transportation, and latterly with the provision of communications links. The work of Jomini (1862) is used as the primary guide to these arguments, with the central premise being that military logistics, whilst encompassing the movement of armies, has a broader organisational function that includes the preparations for war; regulating the movements of troops on the ground; weapons and armament provisions; and the regulation of transport. In effect, from Jomini's extended notion of logistics a broader picture of organisational force is created whereby control of territory and mobility are embedded. As part of this I also address the implications of 'friction' (Clausewitz, 2007). In doing so Virilio's (2006b) work on impediment is considered, especially in light of Jomini's own focus on territorial configurations to overcome impediment. Overall, this section considers military logistics as the mobilisation, supply and maintenance of military force. The bridge between this

line of argument and the next section on commercial logistics is the question of *implementation*.

In the case of military organisational force, the supply line has been a constant spatial focus. Equally, for commercial logisticians the spatial metaphor of the logistics pipeline (Leslie & Reimer, 1999) highlights attempts to extend control over the flows of commodities, products and resources between each of the critical links in the logistics supply chain. From this, a core argument is developed: that of the logistics pipeline as a form of *contained continuity*. It is suggested that the pipeline represents the continuity of flow through the supply chains of global commodity distribution. Whilst at the same time the rhetoric of fluid flows (a common image in logistics and supply chain management) is determined by a containment of continuity in the form of physical partitioning of space. As suggested above, the spatial metaphor of the supply chain is a useful exemplar of the extended operations of logistics and supply chain management beyond container handling. That said, the focus remains on forms of transport mobilities within supply chains, for, as Mangan & Lalwani, (2008:35) propose, “maritime transport (comprising ports as nodes and shipping services as links) is the dominant mode for international freight movements and is thus crucial to international trade and a vital component of many supply chains.” Given this, a notable aspect of logistics and supply chain management is the elimination of *waste*, through the control of the interconnectivity between the nodes and links (Thrift, 2004b:589). As with the issue of friction in military logistics, the eradication of waste (space, time, labour, inventory, mobility) is a constant problematic in commercial logistics.

To try and unpack these discussions further the issue of infrastructure in a wider context than that of containerisation is a specific focus of the next section. My argument here is that the seeming fluidity of flow disguises the powerful infrastructural apparatuses of logistical mobilities. I consider how infrastructure is a core function of logistics and

supply chain management. This apparently 'natural' apparatus depends on the strategic points of interaction between constituent parts of the logistics infrastructure, be those road, rail and sea networks, or architectural forms such as rail terminals, distribution centres, warehousing, sea and air ports, as well as information channels. It is suggested that a prime example of infrastructural power is that of the trade route, and I reconsider the discussion of contained continuity in light of infrastructural power by addressing two points of focus. Firstly, that of the European Union's planned 'Motorways of the Sea' project (DG Energy and Transport, 2006). Designed to overcome the congestion of the EU's road transport networks by moving short distance freight transit onto the EU's maritime networks it is suggested that the task of such a project is to promote the continuity of trade flows and reduce temporal inefficiencies by reconfiguring the spatial logic of European trade space. This can be read in terms of Jomini's consideration of military logistics' need to overcome impediment through territorial control. A second facet of this section is the question of containment. Immanent to the territorial reconfiguration of transport flows is the containment of continuity through the securitisation of supply chain infrastructures. In order to approach this admittedly wide ranging debate one specific aspect of maritime security is considered, that of the International Maritime Organization's International Ship and Port Security Code, the ISPS (International Maritime Organization, 2003). The function of this initiative, like the US's Container Security Initiative (Office of Policy and Planning and Office of International Affairs, Container Security Division, 2006), is to implement pre-emptive and preventative measures to protect the strategic infrastructure of international trade, specifically ships and maritime port facilities. The discussions in this section are intended to address the wider notions of the security apparatus within which logistics operates, and how this is part of an ideology of securitisation that controls the movement of

commodities, information, viruses, populations etc., (see Anderson, 2010; Cowen, 2010b; Srnicek, 2010).

In the final section the focus moves towards a critique of the production of such spatio-temporal forms of control. The hope is to further concretise some of the earlier conceptions of interconnectivity by arguing that commercial logistics is an increasingly important exemplar of the strategic control of global mobilities, most clearly in terms of commodities, but also on wider regulatory levels including the biopolitical (Reid, 2006:33). As such I highlight a broader notion of 'logistical power', and how this embodies *the strategic projection of power across geographical territory, resulting from a configuration of time and space as legible, manageable and calculable*. In doing so the work of Michael Mann is engaged so as to highlight how power—in its multiple guises—is *mobilised* as a form of invisible violence.

The Militaristic Legacy of Logistics:

Before attempting to outline the various strategies of business logistics and the relationship with interconnectivity it is necessary to address the role of military logistics, the natural antecedent of commercial logistical practices. Primarily I argue that the key point of convergence between them is the ability to organise movement through the control of the logistics pipeline or supply line. That is, the physical and informational arteries that—traditionally—have linked together the operations of military campaigns from a centralised base to the theatre of operations. Similarly, in commercial logistics the notion of the ‘pipeline’ is pivotal to the envisioning of the supply chain as the ‘spinal cord’ linking together the various entities of commercial organisations. As briefly alluded to in the previous chapter, the entanglement of military power and commercial practices is evident in the development of Connex boxes and the use of containers in the Vietnam War, as well as the production technologies of early standardisation, where the compatibility of weapons parts was necessary for continued supply (DeLanda, 1991:106-109). DeLanda goes on to identify this bond through the development of the military-industrial complex, i.e., the collusion of militaristic technological advancement with industrial entrepreneurialism (see Koistinen, 1967). Central to the arguments in this chapter is the shared legacy of spatio-temporal control through infrastructure. This is determined by the *mobilisation* of resources in the military context and the mobilisation of capital and commodities in the commercial sphere.

The legacy of militaristic approaches to the mobilisation of resources begins primarily with the publication in 1838 of Jomini’s *The Art of War* (Jomini, 1862). Whilst this has been noted by scholars (DeLanda, 1991; Van Creveld, 1978; Virilio, 2006b), Falk (1986:xiii) suggests that long before this the Romans, in particular, understood the military advantage of providing armies with a continuous supply of weapons, provisions and men. Central to this was the role of infrastructure, notably well-maintained roads that

provided the Roman army with effective lines of communication and supply. At the same time as this logistical knowledge was to prove advantageous to the Roman armies, it was not until the Napoleonic era that logistics as a defined set of military practices was identified. Jomini—a member of Napoleon’s forces—argued that logistics formed one aspect of military knowledge, supplementing strategy, grand and minor tactics, as well as engineering (Falk, 1986:xviii). Strategic knowledge implies the overarching planning behind military campaigns, whilst tactics refers to the implementation of the plan. Thorpe (1986:2) offers a further analogy: “strategy is to war what the plot is to the play; tactics is represented by the role of the players; logistics furnishes the stage management, accessories, and maintenance”. Logistics is often the hidden or unacknowledged aspect of a successful performance.⁴⁸ As we will see below the invisible power of military logistics has corollaries with other forms of spatio-temporal control, including infrastructure.

The background work that goes into implementing strategy is a good place to begin to define military logistics. As Jomini famously stated, logistics is “the practical art of moving armies” (Jomini, 1862), thus highlighting the critical bond between military power and mobility. He goes on to situate the genealogy of logistics with the shift from war being waged from camps located in the ‘field’, to moving troops, armaments etc., and providing resources from fixed bases along *lines of supply*:

“Movements became more complicated, and the staff officers had more extended functions. The chief of staff began to perform the duty of transmitting the conceptions of the general to the most distant points of the theater of war, and of procuring for him the necessary documents for arranging plans of operations” (Jomini, 1862).

Crucially, the move to an extended field of combat where there was continuous supply

⁴⁸ A further analogy is that of the physical body. DeLanda suggests that “if a war machine could be said to have a body, then tactics would represent the muscles and strategy the brain, while logistics would be the machine’s digestive and circulatory system: the procurement and supply networks that distribute resources throughout an army’s body” (DeLanda, 1991:105). From this come some telling phrases, most notably for my arguments, those of circulation and distribution.

from base resulted in a new conception of the logistics chain: that is, the *arteries* through which troops are supplied would take on profound significance, as would the organisation of movement itself.⁴⁹ Prior to this, from approximately the early seventeenth century until the early twentieth century, armies would have to carry key items of hardware with them, whilst living off the land they occupied (Falk, 1986:xiv). Such practices can be as mundane as simply collecting foodstuffs in order to feed troops over an extended period of time as they advance (Thrift, 2004b:179). Logistics in this guise was an art of practical solutions. Clearly this depended on the availability of provisions, and one solution to the potential limitations of provisions was the development of depot systems where fortified depots located en route would feed provisions to troops. However, this method encountered problems when troop movements extended beyond national borders—due, in part, to the weaknesses of the supply lines (Falk, 1986:xv). Of central importance, then, to the shift in approach was the development of technical means to produce and sustain continuous supply from base, most notably through transportation and communication (DeLanda, 1991:32).⁵⁰ Falk notes:

“The growth of railroads, the introduction of steam-powered ocean vessels, and the emergence of gasoline-driven motor vehicles provided new means and methods of supplying and supporting military forces. Advances in communications—the telegraph, telephone, and radio—assured commanders of swifter, surer means of transmitting their needs for logistical backup” (Falk, 1986:xvi).

Such advances in the ability to supply material and information would play a significant part in the growing place of logistics in military power, and particularly crucial to the arguments soon to be developed below with regard to commercial logistics, was the

⁴⁹ This clearly links to the wider notion of circulation, particularly in Sennett’s work on urban circulation and the relationship with the body’s circulation of blood through the arterial system, as discovered by William Harvey in 1628 (Sennett, 1994:255-270; also see Cresswell, 2006:7-8).

⁵⁰ As discussed in the *Contextual Introduction* this clearly displays the critical link between transportation and communication in the wider conceptualisation of distributive space. This is further emphasised by de la Haye (1980:46) when he states: “The means of transporting commodities and the means of communicating messages are strategic activities for both an economic and political viewpoint. Modern industry and the modern army both require sure, fast and efficient transportation and communication”.

ability to sustain connection with troops *at a distance* (see Falk, 1986:xv). Given this, it also accentuates the critical role that the lines of supply (physical and informational) would play in military campaigns.

The development of technical knowledge, as well as communication and transport infrastructure made it clear to Jomini that the notion of logistics as simply the mobilisation of armies did not account for the role that it would play from c.1870 onwards (Van Creveld, 1978). As such he identified eighteen key categories covered by logistics, including; the preparation for war; reconnaissance work; regulation of troop movements (including marching formations (see Thrift, 2004b:180)); movement of munitions, provisions, baggage etc.; regulating transportation; establishing lines of communication (Jomini, 1862). Although the breadth of such activities might embody the majority of military preparations bar combat, Jomini's identification of these logistical mechanisms proves how central to the war machine the role of logistics was, most notably the ideas of preparation, organisation of space-time, and control of movement.⁵¹ Of central importance to these functions are the material means of implementing control. And the issue of preparation provides an interesting example. For Jomini the preparation for war involved the close inspection of all the matériel of combat, including "horses, carriages, caissons, teams, harness, shoes" (Jomini, 1862). Equally the topographical features of the battlefield were also to be identified, and necessary preparations made. So, for example,

"If the campaign is to be opened in the neighborhood of great rivers, gun-boats and flying bridges should be prepared, and all the small craft should be collected at the points and at the bank where they will probably be used. Intelligent officers

⁵¹ Whilst the remit of this section is to outline the wider genealogy of military logistics, and thus focuses on historical commonalities, it is useful to dwell briefly on how these issues relate to contemporary military ideologies. In particular, the Revolution in Military Affairs that has instituted technological systems such as precision bombing, satellites and ICT to provide greater geopolitical strength, points perhaps to the diminishing importance of traditional logistical procedures with its at-a-distance technologies. However, as Graham (2011:156) notes, the micro-geographical tactics of Iraqi insurgents have highlighted significant failings in such utopian technologies. Similarly, Derek Gregory (2012) has recently discussed the continued importance of physical lines of supply into Afghanistan through Pakistan (also see Blanchfield, 2005).

should examine the most favourable points both for embarkations and for landings—preferring those localities which present the greatest chances of success for a primary establishment on the opposite bank” (Jomini, 1862).

Logistics was defined by a specific set of knowledges of the most advantageous positions, and the terrain itself. Indeed Jomini (1862) also identifies the need “to remove obstructions [from roads, and] throw small bridges over creeks”. Folded into the critical function of the supply lines, it is evident that the control over the infrastructure of war plays a fundamental role in military prowess, particularly in overcoming obstacles (see Wood, 2006). As such the problem of obstacles echoes the wider notion of ‘friction’ within military strategy, most notably identified by Clausewitz (2007) as the problematic of uncertainty (Cf. Tsing, 2004).⁵² This reading also underpins the analysis of military logistics by Virilio (2006a; 2006b; Virilio & Lotringer, 1997), where he argues that logistics has dealt with the problem of paths and schedules—i.e., with the *organisation of movement*. Spatially a route is designed to secure the quickest or most efficient path possible, hence Jomini’s discussion of removing obstructions and the Clausewitzian problem of friction. Temporally speaking these ‘paths’ are the schedules that determine moments of movement and intersections in order to predetermine any potential blockages or delays (Virilio, 2006b:112). More forcefully, Virilio argues that spatio-temporal control has been both the remit of military power, but also for capitalist prowess. This is manifested in part by the means to eliminate hindrance, error or destabilising influences more generally through a system of territorial management. Virilio’s paradigm is that of the armoured vehicle which eradicates impediment through sheer technical force. He sees these all-terrain vehicles as more akin to “sans-terrain” vehicles, as they eliminate the inconsistencies of terrain.⁵³

⁵² A more in-depth discussion of friction and uncertainty will be developed in *Part Two* of the thesis. At this juncture it should be noted that Tsing (2004:4) argues how messiness pervades the commodity chains of global capital.

⁵³ Cf. Weizman’s discussion of the strategy of ‘walking through walls’ used by the Israeli Defence Force (Weizman, 2007:185-218).

Overall then, military logistics encompasses the movement, supply and maintenance of military power—as such it can be said to foster a certain type of knowledge: what might be termed an epistemology of *implementation*. We need to recognise from this that military logistics—as an organisational force—is directly linked to forms of social power, through the means to implement political will (Arendt, 1970:4; also see Virilio & Lotringer, 1997:22-23), and to *sustain* it.⁵⁴ These two factors are significant. The modes of implementation are clearly demonstrated through the various arsenals of weaponry, military transport technologies, but fundamentally through logistical organisation of supply lines. Central to my interest in the spatio-temporal configuration of military (and commercial) logistics is that control is manifested through the means to implement continuous movement (where desired) through the construction of such supply lines (including transportation and communications), and their maintenance. The purpose of such apparatuses is to enforce a specific ideological will, but equally in doing so we can begin to discern the relationship between these value systems and their practical mobilisations.

The Commercial Logistics ‘Pipeline’:

Although the stance taken by Virilio and DeLanda regarding the connection between military power and commercial advantage may not be widely shared (to say the least) across the commercial logistics community, their assertions offer us some valuable points of discussion. By identifying the importance of organising movement Virilio highlights both the territorial function of spatial and temporal formations, whilst also addressing the administrative function of implementation. Equally, the problematic of friction is a significant shared fault line: for both military and commercial logisticians the ability to

⁵⁴ On a wider conceptual level, and one that returns to the discussions in *Interlude I* on modes of ordering, Arendt outlines the impact of uncertainty on the calculability of war/violence (Arendt, 1970:7-8). Critically, she argues that attempts to invalidate uncertainty as simply ‘random events’ is a strategically grounded effort to ‘rubbish’ any alternative.

predict as well as overcome impediments is critical. How then do these relate to contemporary commercial logistics practices? Essentially both approaches are concerned with the preparation, administration and implementation of physical and informational movement through lines of supply.⁵⁵ More pointedly still, both adhere to a certain conception of *organisation* as the ability to predetermine the lines of supply by designing material, and computational infrastructures of implementation (Bratton, 2006:8; Thrift, 2004a), and to sustain continuous flows through the lines of supply by securing the strategic points of networked connectivity. Where the growth of commercial logistics emanated from military practices, in more recent times the work of commercial logistics has inflected upon military practices, most notably in ‘distribution-based logistics systems’, a concept which focuses on the velocity, responsiveness and precision seen with commercial logistics, as opposed to a mass of supply inventory more traditionally associated with military logistics (see McKay & Flowers, 2000; Piggee, 2002; Wallace & Hardy, 1999).⁵⁶

Returning to the origins of commercial logistics Allen (1997:106) identifies its fundamental remit as the control and management of the supply chain. He goes further, by observing that logistics is

“a multidisciplinary approach concerned with how to coordinate all purchasing, selling, and producing activities together in order to assemble and distribute the right products in the right amounts to the right locations in the right condition so as to maximize profits for the firm” (Allen, 1997:116)

Up until the 1950s, Allen also argues that the role of transportation was seen as an inevitable fact of business activity, with the assumption that the innovative skills needed

⁵⁵ A parallel strategy can be seen in the military’s notion of the ‘kill chain’. This is a series of actions where a target is identified, a force deployed, the decision to attack is made, and the target destroyed (Cheater, 2007). As with the rhetoric of frictionless logistical space-time, this apparent ease of moving through the kill chain masks the infrastructure of attack. According to Gregory (2011:196) the apparatus of the kill chain has become increasingly complex in intelligence-driven warfare (also see Cockburn, 2012; Graham, 2011:172-173).

⁵⁶ In a more critical context Graham (2011:155) relates the technologies of the Revolution in Military Affairs to commercial logistics practices, notably just-in-time scheduling.

to develop a product or to market it were not necessary in the transportation of finished goods (or raw materials) from producer to retailer.⁵⁷ In the U.S. in particular this was, in part, due to the tight regulation of the freight transport sector in the mid-20th Century (Allen, 1997:107). One of the changes that instigated the ‘logistics revolution’ was the market-driven deregulation of freight transit. Shashikumar and Schatz (2000:8-9) note that the growing power of transport companies was a result of regulatory changes, most clearly with the U.S. Shipping Act of 1984. The economic imperatives of such a move meant that significant cost-reductions and time saving were possible with greater emphasis on the *control* of transportation. Critically, Allen (1997:108) suggests that the potential value of transportation to the success of corporate organisations came as a result of the recognised power of logistics in World War II and the Korean War. Added to this the U.S. recessions of the 1950s and 1970s, as well as oil embargoes, emphasised the potentially negative impact of rising transportation costs, inflation, interest rates and inventory charges. So, “the combination of high carrying costs and the promise of lower transportation costs gave logistics a major push in recognition” (Allen, 1997:108). Echoing Jomini’s arguments concerning the broader function of military logistics, the growing recognition of the power of logistics in 1960s was also part of a wider ideology of systems-based thinking (Allen, 1997:110; DeLanda, 1991; Gomes & Mentzer, 1988). Here, the “entire system of production and distribution [was brought] into focus” (Cowen, n.d.). This is a decisive aspect of the move toward the global reach of logistics and supply chain management. Whilst the critical developments of containerisation pointed to the important role of transportation, the move from ‘physical distribution’ to the broader concept of ‘logistics’ illustrates the creeping power of logistics across the

⁵⁷ Given that Allen’s focus is on the development of logistics in relation to transportation this may account for the lack of consideration given to other significant advancements at this time, including air travel, or more pointedly the wider innovations within consumer marketing and product styling.

various operations of commercial entities.⁵⁸ Indeed logistics is the “common link that weaves all the traditional functions of the firm together” (Allen, 1997:110).⁵⁹ Such management practices are now concerned with the facilitation and co-ordination of the movement of raw materials, manufactured commodities and resultant waste materials from production processes. Echoing this, the Council of Logistics Management defines logistics as:

“part of Supply Chain Management that plans, implements, and controls the efficient, effective forward and reverse flow and storage of goods, services, and related information between the point of origin and the point of consumption in order to meet customer requirements” (cited in Mentzer, Min & Bobbitt, 2004).

Both Allen’s earlier definition and The Council of Logistics Management’s emphasise the attempts to 1) plan, 2) manage and 3) secure the movement of commodities, services and their attendant bureaucratic structures (Brown and Laurier, 2005:23). Thrift concurs, adding that logistics represents “a set of knowledges synonymous with movement, effectively the science of moving objects in an optimal fashion” (Thrift, 2004a:589). In the language of logistics there is an overt emphasis on this scientific approach, premised on the facilitation and co-ordination of movement (Mentzer & Kahn, 1995; Rushton, Croucher & Baker, 2006). This is a decidedly spatial and temporal problematic—how to construct and maintain the most efficient modes of mobility? Looking to Figure 23 we can see the distributive phase of logistics. Given the emphasis on controlling the flow and storage of goods this quintet of practices highlights the spatial and temporal operations of distribution. Spatially, the packaging of goods in appropriate systems is significant for the safe transit of items, however, as we saw with the example of historic methods of stowage, the spatial efficiency of packaging is inherent to this stage. The issue

⁵⁸ Allen (1997:110) notes that the change in terminology from physical distribution to logistics management occurred in the U.S. in 1985 with the move from the National Council of Physical Distribution Management to the Council of Logistics Management.

⁵⁹ Unsurprisingly this concept of weaving together various functions echoes the remit of military logistics. Jomini argued that military chiefs-of-staff “should be acquainted with all the various branches of the art of war” (2008), thus outlining the connective role played by logistics.

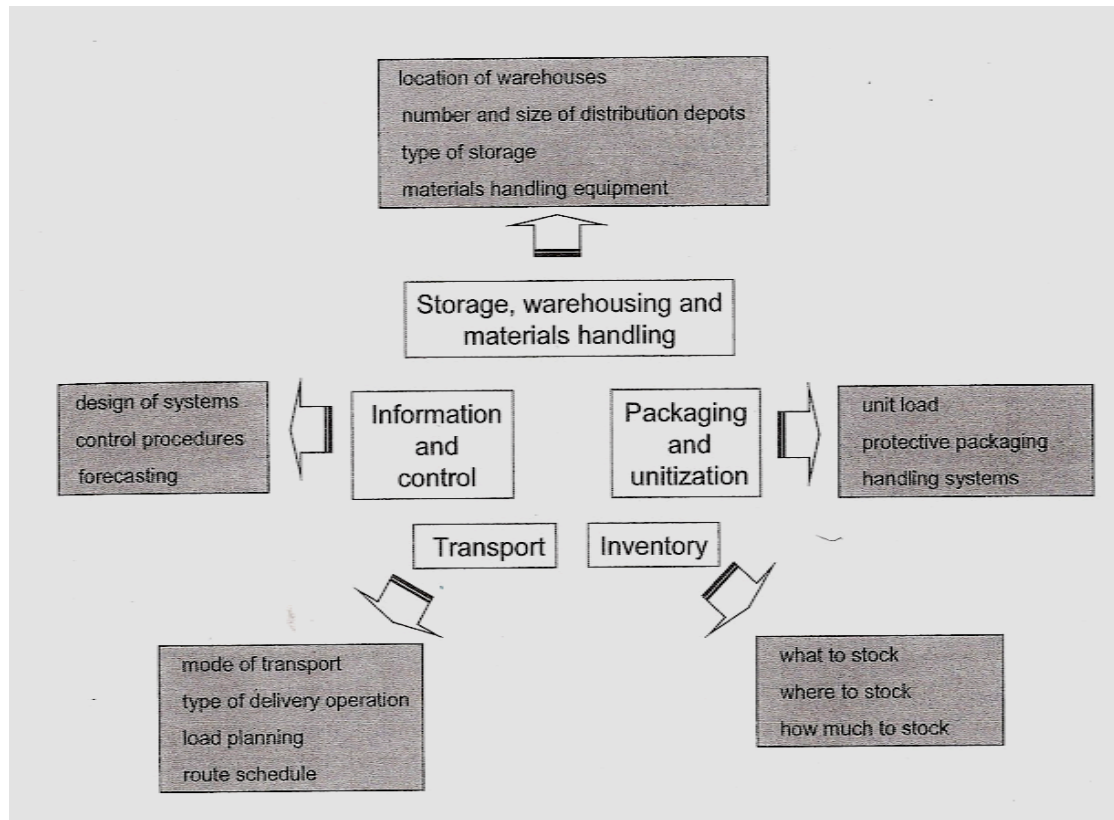


Figure 23: Distributive phase (Source: Rushton, Croucher & Baker, 2006:7)

of storage is also critical: not only are inventory stock decisions part of the procurement process and as such effect wider manufacturing cycles (as with JIT), but the storage facilities themselves are equally decisive. Distribution centres and warehouses are central to the geographies of distributive space, for the location of these services can impact upon the speed and thus cost of distribution, depending on the proximity to a retailer for example (Rushton, Croucher & Baker, 2006:135). The mode of transport itself is also said to have an important bearing on the temporal nature of distributive time-space. For instance there are a series of different considerations between distribution via rail networks as compared to road transport, most notably in terms of economies of scale and thus the specific demands on when goods are to be delivered. Finally—and the factor which threads throughout all contemporary forms of distribution—is that of the computational and informational procedures needed to implement all of the above. We saw this for example with the use of the pager system and Destin8 at London

Thamesport. From such a diagrammatic representation of the distributive phase of logistics we can begin to build an image of the particular aspects of distribution mobilities. This image clearly suggests how the interactions between the various decision-making processes are necessary to enable the “delivery of the right product at the right time to satisfy customer demand” (Paché, 2007:315). However, as is apparent from Allen’s discussion of the growing importance of the logistics sector beyond transport, the distributive phase is part of a wider system of control.

Unsurprisingly, the arguments raised in the *Contextual Introduction* and in *Chapter One* concerning the ordering of interactions between intermodal containers and their attendant infrastructure are central aspects of networked logistical flow. The ideology of logistics is typified by a similar focus on interactions between the various aspects of the supply chain (Bonacich & Wilson, 2008:5). In order to appreciate such relationships between logistics and wider systemic control we can engage Figure 24. The diagram outlines the interrelationships between the various organisations, components and processes of a logistical system. Where previously the operations of producers and retailers were seen in isolation, under logistics, certain aspects of supply, materials management and distribution are controlled by one company, often third-party logistics providers.⁶⁰ A further factor illustrated by Figure 24 is the added importance of the various nodes in the supply chain. As previously noted in the *Contextual Introduction*, not only are the production and retail aspects central to the system, the materials management and distributive phases are of equal import, as are the points of interaction between each of these. Similarly, where traditionally physical distribution management was primarily responsible for transport of finished goods, the remit of logistics has been broadened to encompass the flows of information (Rushton, Oxley & Croucher, 2000:9),

⁶⁰ Third party logistics providers refer to the outsourcing of logistics and supply chain management to specific providers of these services, rather than running them in-house.

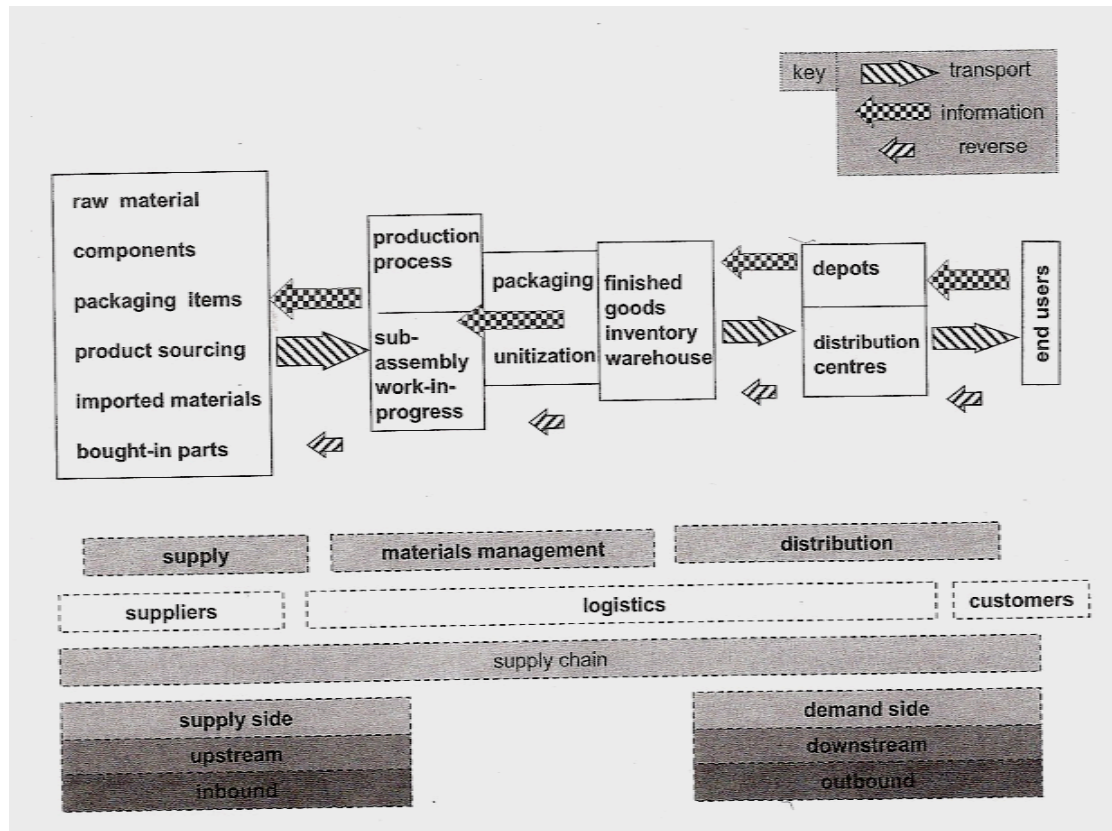


Figure 24: Logistics and Supply Chain (Source: Rushton, Croucher & Baker, 2006:5)

reverse flows of recycled products, certain aspects of assembly, as well as transport (which is still a significant cost outlay for logistics companies (Allen, 1997:111)).

However, perhaps the most illuminating factor to emerge from Figure 24 is the all-encompassing presence of the supply chain itself.⁶¹ The concept of the supply chain began to emerge in the 1990s as it was recognised that logistical processes offered competitive advantage to companies, and that this could be extended to encompass not only individual companies, but also a ‘chain’ of companies involved in all the various processes of product development for example (Rushton, Oxley & Croucher, 2000:9). So, where efficiencies had been premised on individual approaches, the supply chain

⁶¹ The increasing importance of supply chain management is demonstrated by the insertion of the supply chain channel into the 3rd and 4th editions of *The Handbook of Logistics and Distribution Management*. As Rushton, Croucher and Baker (2010:4) discuss, the key difference between logistics and supply chain management is the wider scope of the supply chain, encompassing suppliers and customers, as well as logistics. For the purpose of my argument in this chapter the use of both logistics and supply chain management is intended to more broadly reflect the idea of overarching systemic control.

model envisions a series of organisations linked by the supply chain itself. Developing this, a supply chain can be defined as “a set of three or more entities (organizations or individuals) directly involved in the upstream and downstream flows of products, services, finances, and/or information from a source to a customer” (Mentzer et al., 2001:4). Including organisations such as producers, suppliers, distributors and retailers, it is clear that of critical importance to the operation of supply chains is the process of flow, or relationality, between these various actors. Principally, supply chains emphasise the way in which the shift beyond the movement of commodities/raw materials broaches a wider organisational logic where the extended spatiality of corporate structures, necessitated partly by globalisation, reaches beyond bounded national territories, to encompass multi-national corporate structures such as TNCs, as well as extra-national allegiances.

In this guise the spatiality of the supply chain itself becomes decisive. Although supply chain dynamics are decentralised in comparison to the Fordist legacy of stockpiling inventory, thus implying increased levels of flexibility, fluidity and mobility (Paché, 2007:316), the rhetoric of such fluidity needs to be disseminated. We can begin to do so through considering the function of the “logistics pipeline” (Rushton, Croucher & Baker, 2006:9; also see Piggee, 2002:3). Echoing the spatial metaphor of the supply chain itself, the function of the logistics ‘pipeline’ is revealing in its attempt to smooth the flows of commodities, products and resources between each of the critical links in the supply chain (also see Collier, 2004).⁶² As illustrated in Figure 25 the function of the pipeline is

⁶² The issue of spatial metaphors continues to raise interesting debates regarding the function of the metaphor as a lens for understanding complex social and spatial processes (see Demeritt, 1994; Howitt, 1998; Leary, 1995; Levine, 1995; McCloskey, 1995; Reid-Henry, 2012; Silber, 1995). In the context of commodity flows my critical focus on the ‘pipeline’ is intended to reflect its use within logistics and supply chain management. Other spatial metaphors include ‘goodscapes’ (Bello, 2008; 2010). By utilising the metaphor of the pipeline to critique the notion of controlled flow I am aware of the discussions concerning the connotations of such object-centred metaphors. Thien (2005), in her criticism of the use of such metaphors, argues that they embody a distanced, masculine approach to experience. Whilst cognisant of this argument, my own position is closer to that of McCormack (2006) who holds to the value of such material artefacts

to

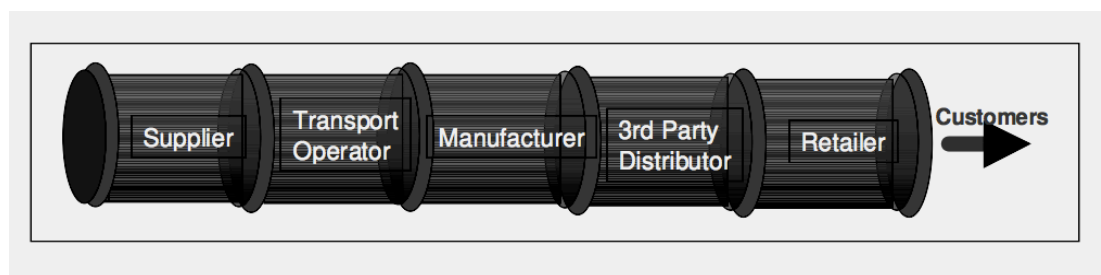


Figure 25: 'Logistics Pipeline' (Source: Rushton, Oxley & Croucher, 2000:10)

create a *bounded* space of operation with a clear delineation between inside and outside. This is a critical problematic of the supply chain ethos: for although the impression given is one of fluid, continuous movement upstream and downstream through the pipeline, such a notion of flexibility is determined by a forceful entrenchment of control over these mobilities.⁶³ For Rushton, Oxley and Croucher (2000:31) the logistics pipeline affords a sense of a “single entity rather than a series of fragmented elements such as procurement, manufacturing, distribution, etc”. In this guise the metaphors of fluid flowing smoothly through the pipeline are illuminating, for there is the suggestion that a pipeline affords a sense of fluid continuity over and above the need to link fragmented elements within the supply chain. This once again concerns the perennial problem of inventory stockpiling: rather than goods being held in warehouses, the function of the logistics pipeline is to keep stock moving, thus the critical importance of continuous flow to supply chain ideologies (Rushton, Oxley & Croucher, 2000:31).

(even as metaphors) for the delineation of the everyday. Above all, my own interest in metaphors attunes to Serres' argument that metaphors are a form of 'transport' (Serres with Latour, 1995:66).

⁶³ On the wider idea of the pipeline within the lineage of containerisation Banham discusses the potential changes to dock spaces through the technological development of vehicles such as hovercraft which he argued may make the “*water* in docks obsolete, if multi-function pipelines haven't hovercraft obsolete” (1967:232 emphasis in original). In his trademark style Banham half-seriously offers us a utopian vision of frictionless movement, where a multi-function pipeline acts as a conduit for the smooth flow of goods and other such forms. In a way this is not significantly divorced from the earlier designs for the smooth movement of grain in the elevators discussed in *Chapter One*, nor the chutes used in the Boots 'wets' factory in Nottingham in the 1930s (see Darley, 2003:125).

Here the contained *and* continuous nature of the pipeline is revealing. A pipeline is a partitioned space of flows where the separation between inside and outside provides a protective boundary (Cf. Barry, 2011). In relation to the question of partitioning, Sack's (1986) work on territoriality deals with understanding space as partitioned, on the grounds of efficiency and rationality. But Sack argues that the partitioning of space is reliant on the interconnections between partitions: "the whole must be territorially partitioned. Each partition must contain one type of individual or process. Yet each must be integrated into the whole" (Sack, 1986:181). Echoing the striation of space identified by Deleuze and Guattari (1988:363), partitioning highlights the divides between distinct spaces of inclusion and exclusion. However, this spatial organisation of the world depends on the ability to *integrate* distinct partitions, that is, the means to produce continuity. As such we can begin to appreciate the constitution of the logistics pipeline and logistical space more broadly, as a form of *contained continuity*. In this sense there is a direct correspondence with my earlier discussion of the packaging of efficiency within the context of the genealogy of containerisation, for both articulate the protective atmosphere of an enclosed whole, but one that is *distributed*.

For logisticians the contained continuity of the logistics pipeline offers competitive advantage to companies who recognise its value. A review of selected literature on commercial logistics (see Bonacich & Wilson, 2008; Cooper, 1993; Fabbe-Costes, Jahre & Rouquet, 2006; Goldsby & Martinchenko, 2005; Levinson, 2006; Mentzer et al., 2001; 2004; Rushton, Croucher & Baker, 2006) reveals this familiar argument. Like the supply line focus of military logistics, it is with the management of flow that competitive advantage begins to appear. The control of inventory is one of the significant areas where logistics is said to improve company efficiencies, with others including control of costs; systemic flow; and overall service orientations (Bonacich & Wilson, 2008:4; Mentzer, Min

& Bobbitt, 2004). Perhaps the most noteworthy aspect to emerge from the management of flow through the logistics pipeline is the elimination of *waste*. Whilst the facilitation, co-ordination and scheduling of movement through ICT systems such as Destin8; control over operational processes at a distance; and forward planning to consider future changes in demand for particular products and services, testify to the core practices of logistics, these are primarily used to eradicate wasted resources (Rushton, Croucher & Baker, 2006:4). As with the problem of friction in military logistics, the elimination of waste is an ever-present problematic in commercial logistics. Directly linked to the remit of JIT, the eradication of waste covers that of labour, inventory, mobility, space and time (Rushton, Oxley & Croucher, 2000:29; also see Goldsby & Martinchenko, 2005:4). These core factors are deemed critical to the generation of value across the logistics pipeline. Taking each of these separately we can begin to build a picture of the logistics mindset as one of reducing supposedly unnecessary impediments to efficiency. Already identified in the discussions on containerisation, the issue of labour clearly defines a certain ideological approach to 'value', in terms of how workers are conceptualised. Paché notes, the "permanent search for productivity gains" has affected the mechanisation of labour, as well as the demand to alleviate "workers' idleness" (Paché, 2007:313). In terms of inventory it is critical to note that the container itself has been deemed central to the effective continuous flow of inventory as opposed to stockpiling in warehouses. And recent advancements in logistics and supply chain management practices such as 'Lean Six Sigma' (Goldsby & Martinchenko, 2005) emphasise the stockpiling of inventory as a core problem. The over-reliance on inventory stock levels is said to reduce the flexibility of supply chains whilst slowing the continuity of flows. As a management strategy Lean Six Sigma focuses primarily on reducing the wasteful accumulation in stock and instead focuses on speed. Wasted space is directly related to the problem of inventory stockpiling and the need for physical space to house commodities (Goldsby & Martinchenko,

2005:22). Here then the centrality of accelerated flows is evident: in this paradigm the speed of flows is said to be a demonstrable tool for planning “accurate order cycle times, reorder points, effective stocking locations, and effective transportation systems” (Goldsby & Martinchenko, 2005:76). Again linked to the ‘lean’ manufacturing model, in this model pre-determining each of these steps is read as critical to the smooth flow of goods or inventory assets. The final area of focus for strategic logistics approaches such as the Lean Six Sigma is that of variation: this returns the discussion to the question of contained continuity. For Goldsby and Martinchenko (2005:6) the central remit of Lean Six Sigma is to reduce variation: to reduce systemic variability such approaches focus on the need to control variations in the supply chain, both through pre-planning, but also through flexibility, the latter of which implies a space in which strategic reactions can take place, but which nonetheless is a governable space in its own right.

Governing Logistical Flows through Infrastructure:

To be sure, the government of flow is a central facet of logistics and supply chain management. Mentzer et al., elucidate their definition of supply chain philosophy by describing it as “a systems approach to viewing the supply chain as a whole, and to managing the total flow of goods inventory from the supplier to the ultimate customer” (Mentzer et al., 2001:6), adding to this the importance of synchronisation (see Clark, 1990). Rather tellingly we can see the overarching premise of logistics & supply chain management, with its emphasis on *systemic wholeness* and *the management of flow*. As discussed above this twin conception may account for the notion of the contained continuity of the logistics pipeline. However, this spatio-temporal constitution of the logistics pipeline fails to account for exactly how such flows are *produced*. The spatial metaphor of the logistics pipeline has to be further critiqued, and in particular the seeming ease of such fluid flows. My argument here is that the purported fluidity of flow serves to mask the extremely powerful infrastructural apparatuses that lie behind logistical mobilities. I argue that the design, construction and maintenance of infrastructure are central functions of logistics and supply chain management, and in effect this seemingly invisible apparatus disguises the strategic points of interaction between constituent parts of the system. So rather than the ostensibly fluid forms of flow there is a tightly coupled, highly complex system of interconnectivity that depends on stability. Central to this is the issue of *interaction*. Historically, the work of Forrester (1958) was an early barometer of the growing focus in early systems management on the control of interactions (also see Mentzer et al., 2001).

Forrester suggests:

“Management is on the verge of a major breakthrough in understanding how industrial company success depends on the *interaction between the flows* of information, materials, money, manpower, and capital equipment. The way these five flow systems *interlock* to amplify one another and to cause change and fluctuation will form a basis for anticipating the effects of decisions, policies, organizational forms, and investment choices” (Forrester, 1958:37 my emphasis).

We can see that Forrester's proposition expands the focus of traditional corporate structures by highlighting the interactions *between* various actors, rather than their separation (Forrester, 1958:38). Whilst it is possible to identify a variety of points or moments when the interactions prove decisive to the functioning of supply chains, given the discussions concerning mobilisation, the role of transport infrastructures in particular are critical. To this end I turn to the critically important role played by infrastructure in promoting what Gibson (2007) calls the "path of least resistance" in eradicating any potential 'disturbances' to the flows of goods. One way we can begin to build a critique of such infrastructural forms of control is through attending to the way in which continuity is produced through the strategic points, or junctions, of interaction.

Graham and Marvin's (2001) work has been crucial in its identification of the interconnections between seemingly geographically disconnected sites in global supply chains. As we saw with the brief outline of the move of the Port of London to Tilbury (Figure 22), the infrastructural linkages required to produce an integrated transport system have ultimately led to the decoupling of port spaces from traditional maritime communities, with resultant shifts in their social, cultural and economic contexts. So we see a form of decoupling from traditional maritime spaces and an infrastructural *coupling* on a global level (Graham, 2001:9). Echoing the discussion of containerisation in the previous chapter, the production of supply chain interconnection depends on "infrastructural connectivity" (Graham & Marvin, 2001:358). Such infrastructural forms include the aforementioned transport infrastructures of road, rail and sea networks, including rail terminals, sea and air ports, the attendant vehicles, ICT channels, as well as distribution centres, and warehousing. The affordance of continuity between each of these nodes is dependent on how they 'adjust'. That is, the sites and vehicles are linked by "tunnel effects" (Graham & Marvin, 2001:358), where the coordination and synchronisation of connection occurs between physically disconnected sites. So for

example, the link provided by a shipping container between the port where it has been imported and the final destination is dependent on a number of adjustments: obviously the transfer between ship to shore as outlined in the previous chapter; but also the transit of the container either via road, rail or smaller feeder vessel to distribution centres; the emptying or ‘stripping’ of the goods from the container at the distribution centre; the repacking of the goods; and the transit of these goods to the retailer’s warehouse. Each of these ‘switches’ between links and nodes in the logistical supply chain highlight the significance of infrastructure, be they the road network, the rail tracks, seaborne highways, and of course the computational infrastructure facilitating the maintenance of communication (Bratton, 2006; Thrift, 2004b).⁶⁴

The study of infrastructure has become an established body of research within the social sciences and beyond (see Star, 1999; Star & Ruhleder, 1996; Graham, 2010; Graham & Thrift, 2007). The reasons for this are clearly related to the networked geographies of globalised production, the circulation of commodities, be they consumer goods, oil, gas, etc., as well as recent interest in the geopolitics of maritime infrastructure (Lehr, 2007; Middleton, 2008,) terror networks and smuggling syndicates (SOCA, 2009/10). The role of infrastructure elicits the question, as asked by Law: “how should we identify the strands that lie beneath the social surface?” (Law, 1991:10-11). The tone of this question identifies infrastructure as a substrate or ground upon which action occurs (Star & Ruhleder, 1996:112). It is a form of ‘making possible’ (Callon & Law, 2004:8). Infrastructures make possible the social by providing a technological-material *armature* that facilitates the growth of social forms, such as the city for example (Gandy, 1999). Perhaps as a result of this there is a tendency to take infrastructures for granted, to the extent where they—like the discussion of containerisation in the previous chapter—

⁶⁴ In this way the discussion in the *Contextual Introduction* of Thrift’s paratextual forces (2004b) can be linked to the first-wave of physical infrastructure, as well as the second-wave of computational infrastructures. Although the second-wave is critical to the power of contemporary logistical infrastructure my primary focus here is that of the first-wave.

become black-boxed and invisible (Graham & Thrift, 2007:10; Star & Ruhleder, 1996:112).⁶⁵ This is where one aspect of their power resides: through the seeming ability to produce action without *perceivably* doing so. The key to the wider notion of logistical power emanates from the shaping of the natural and material world in order to fully implement perceivably ‘normalised’ and ‘naturalised’ social action. In light of this, it is precisely this aspect that needs to be addressed, for infrastructures are significant forms of social organisation (Star, 1999:380) and control (Winner, 1980:123-124). Equally, as Graham and Thrift (2007:10) stress, the notion of stable infrastructures (like standards) is a mythical construct. They are not permanently embedded, and they must be maintained.

In the present context the infrastructure behind logistics and supply chain management, and commodity flows in particular, embodies a critical position in the production of mobility. Given the remit of eliminating wasted time and driving up efficiencies across the supply chain, a prime example of infrastructural power is that of the trade route (both on land and at sea), where the construction or designation of infrastructure promotes the most efficient mobilities. As with the legacy of military supply lines, geographic advantage is clearly central to this argument, as, according to a logistics specialist (Gibson, 2007) is the design of the shortest routes possible, be that in relation to the localised movements of containers in ports (as described previously), or indeed the macro-scale supply chain flows. I now address two specific instances of trade route infrastructures, both of which fold back into the earlier discussion of the twin constitution of logistics *continuity* and *containment*, but also with regard to the specific problematic of waste and friction. In the first case, if we look to the example of maritime trade routes there is recent evidence of the use of such routes to overcome the bottlenecks of road infrastructure, through the construction of “floating infrastructure”

⁶⁵ Dodge & Kitchin (2004:159) raise the issue of invisibility in relation to Internet infrastructures: however, in contrast they suggest that physical infrastructure remains largely visible. Whilst this is the case in terms of the material presence of physical infrastructure such as roads when compared with the immaterial qualities of virtual infrastructure, there are clearly distinct physical manifestations of this, including the vast buildings housing computer mainframes.

(DG Energy and Transport, 2006:4). Secondly, we can look to the protection and securitisation of infrastructure through the example of the International Maritime Organization's 'International Ship & Port Facility Security Code'. Both are concerned with the infrastructural organisation of space-time for differing, but conjoined, purposes of accelerating and maintaining commodity flows.

The Continuity of Maritime Control:

The legacy of the ocean as a space of mercantile conquest rests on the purported historical legitimacy of oceanic trade routes themselves as freely available spaces. This argument was disseminated through the work of Hugo Grotius and Alfred Mahan (see Tangredi, 2002). Grotius' 1604 essay, 'The Freedom of the Seas', commissioned by the Dutch East India Company, spoke of the free ocean as "a mercantilist, international, inexhaustible space" (Connery, 2001:178). His approach was based on the juridical question of the ocean's occupation, arguing that "the sea is common to all, because it is so limitless that it cannot become a possession of any one" (Grotius, cited in Connery, 2001:178). Indeed the approach to the common 'ownership' of the sea reflected the 'communia' of the air (Butler, 1990:214). This earlier 17th Century notion of the ocean as a space of mercantile freedom was challenged in the late 19th Century with the growing territoriality of international maritime law. Whilst both postulations of the ocean as a mercantile space are premised on the mechanisms of spatial control, the latter conceives of the ocean as a *definite* space (i.e., definable), rather than one of adventurous conquest. In contemporary terms we see that capitalism utilises a spatial logic that is redolent of these earlier forms of trade, viewing ocean-space in particular as "a great void of distance, suitable for annihilation" (Steinberg, 2001:163). Mahan argued that control over the ocean, in the interests of naval and trade dominance, was premised on the "capacity to project force" (Connery, 2001:186) via the strategic potential of oceanic trade routes. The

territorial control of common land, making it one's own, is part of an expansionist mindset which is concerned with the taking of space, i.e., the ever-increasing distribution of power across the globe through the strategic organisation of space for promoting continuous flow. Mahan recognised the centrality of such flows or 'lines of travel' to the dominion of the ocean. The link between Mahan's work on the control of sea-lanes and military logistics more broadly has been noted previously (Falk, 1986:xx), but it is important to stress the connection between the projection of naval force, and infrastructure, through 'Sea Lines of Communication' (SLOC).⁶⁶ These are maritime arteries that are located at some of the most politically significant and strategically important geographical locations around the globe, including the Straits of Malacca in the South China Sea, and the Gulf of Aden.⁶⁷ As such, SLOC reflect the earlier discussion of supply lines as spaces for the continuous mobilisation of military resources. Similarly, in the context of maritime trade SLOC are significant for their geographical advantage in promoting the most efficient flows of trade around the globe. Whilst they may not adhere to the technological configurations of adjustment described by Graham and Marvin such sites nonetheless afford global continuity through their strategic geographical position, as well as the security apparatus in place to enforce continuity. Historically, for Mahan the power of the nation-state was partly dependent on its relationship with the ocean, but also in terms of the strategic position of arteries such as the Suez and Panama Canals that facilitated the operation of the trade routes (see Mahan, 1987:33).⁶⁸ Although there is notable historical distance (and geopolitical specificity)

⁶⁶ Nincic (2002:143) refers to 'Sea *Lanes* of Communication' to reflect the role of maritime trade, as opposed to their militaristic legacy. That said, she defers from using the term 'Sea Lanes of Commerce' in order to admit the continued significance of the military for the protection and security of these maritime trade routes

⁶⁷ In a somewhat less geopolitically-strategic context Robert Macfarlane discusses the importance of traditional sea routes, for navigational, cultural, religious and trade purposes, especially on the Atlantic fringe running from the Shetland Islands down to the Breton coast (see Macfarlane, 2012:87-115).

⁶⁸ Mahan mentions the potential of the then-unconstructed Panama Canal to US trade supremacy.

between Mahan's work on the development of trade routes and current maritime trade arteries there are clear correspondences: most notably the continued geopolitical importance of the territorial control of oceanic spaces for political and economic advantage. For example, as with the historical precedent of the Mediterranean Sea, maritime trade routes in the European Union are essential for the continuous operation of global supply chains.

Attesting to the power of maritime space, the recent development by the European Union of the 'Motorways of the Sea' (MoS) initiative offers a telling case in point of the sustained importance of maritime transport infrastructure (Commission of the European Communities, 2001; DG Energy and Transport, 2006; Fiedler, et al., 2006). This project, intended to have been implemented by 2010 was conceived as early as 1996 as part of EU transport policy, although it was not fully outlined until 2001 (Commission of the European Communities, 2001).⁶⁹ The primary argument of this initiative is that throughout Europe road transport networks are overcrowded, with severe bottlenecks on key overland routes such as those across the Alps and Pyrenees (DG Energy and Transport, 2006:1). As with the problematic of Clausewitzian friction, such chokepoints create significant inefficiencies in the flows of goods throughout Europe, most pointedly in relation to wasted time. The development of a network of motorways of the sea is intended to alleviate congestion caused by the transport of goods on European road networks, doing so through the construction of "floating infrastructure" (DG Energy and Transport, 2006:4). This notion of floating infrastructure offers an interesting outline of the strategic significance of infrastructure, and the relationship with the earlier designation of ocean space. Referring specifically to the role of ships to the infrastructural power of EU trade, the concept of floating infrastructure may be extended

⁶⁹ In a report on the progress of the MoS project Bonne (2011) notes that the initial phase of the project encountered a number of problems, including low quality bids from maritime transport companies. At the time of writing, Bonne notes that new calls for bids will continue into 2013.

further by identifying the ocean itself as *designated* infrastructure. Instead of the significant economic and material outlay needed to construct road or rail infrastructure, ocean space (like air space) offers a form of ‘natural’ infrastructure through the legal identification of territorial waters. In the case of the ‘Motorways of the Sea’ the infrastructure will consist of four major sea corridors, covering the Baltic region (including Northern European Countries), Western Europe on the side of the Atlantic Ocean, South-Eastern Europe covering the Eastern Mediterranean, and South-Western Europe covering the Western Mediterranean. These corridors are designed for short sea shipping routes and are said to relieve road congestion, whilst also reducing journey times between member states of the EU. A decisive factor in this argument for transferring the infrastructure of commodity logistics from land to sea is the economic imperative of creating continuity of flow. It is argued that

“[the] establishment of sea motorways is much cheaper than that on the land. It was estimated that only 400 million euros are needed to construct four ships to make round turns in a sea motorway. In contrast, 6 billion euros would need to be invested in rail tunnels in the Pyrenees to transport lorries by train” (DG Energy and Transport, 2006:17).

Once more the central objective of infrastructural control becomes evident. A lack of efficiency in commodity flows (seen with road congestion) results in increased transport costs, thus necessitating the reconfiguration of the infrastructural logic of European trade space. This is demonstrated most palpably by the discussion of the economic costs associated with building ‘floating infrastructure’ in the form of ships, as opposed to the full-scale infrastructural development required with road or rail networks. In this guise, ocean space appears rather more governable than land (see Steinberg, 2001:163), and as such the implications for the notion of continuity are apparent: supply chains must be (re)configured so as to promote the *continuity* of trade flows.

Securing Continuity through Containment:

As evidenced by the discussion of the logistics pipeline, the spatial politics of internality and externality is central to the networked configuration of commodity flows. Whilst the logic of continuity is expressed by the above example, immanent to such an approach to space-time is the containment of continuity through protection or securing of supply chain infrastructures (see Sarathy, 2006; Sheffi, 2001; Tang, 2006). Securitisation is a complex apparatus of practices and procedures that complement the very mechanisms of interconnection across the supply chain. Equally, the limitations on movement that security practices impinge have the potential to disrupt the free flow of commodities (Cowen & Smith, 2009:32-33). The wider security apparatuses within which logistics operates act according to a multiplicity of practices and controls on the movement of commodities, information, viruses, populations etc. In part, this can be seen through the logic of containment.

Contemporary modes of territoriality operate through the creation of evermore-sophisticated conceptions of the border. However, the border is far from static: it permits certain people through it, whilst simultaneously limiting entry according to categorisation (Torpey, 2000). This dual function of the border suggests that the political rhetoric of an unbounded flow of objects comes with a concomitant reassertion of the nation-state's power to limit corporeal movement, as well as corporate power to control supply chain flow. Instead of the notion of the fixed border there are now "complex and varied patterns of both implicit and explicit bordering and ordering practices" (van Houtum, Kramsch & Zierhofer, 2005:2) that seek to control and order all forms of movement. In its heterogeneous formation the security apparatus is constituted by various formations: where material boundaries might typically take the form of wall, fence, gate, or seam as practiced forms of governance, control can also be extended into the textual arena in the form of legal-political discourse. In this case I refer to the

International Ship & Port Facility Security Code (ISPS) (International Maritime Organization, 2003) as a mode of textual security. This idea of textual security refers to the notion of security at a distance, whereby the concrete manifestations of security are firstly produced through official statutes that determine the form material entities may take.

The ISPS Code came into force in 2004 following a 2002 conference held at the International Maritime Organization in London. The intention of the ‘Conference of Contracting Governments to the International Convention for the Safety of Life at Sea 1974’ was to update the existing Safety of Life at Sea Convention (SOLAS) following the 9/11 attacks in 2001. The amendments to SOLAS included the adoption of the ISPS Code. Given the purported threat of terrorist activity the remit of the Code at first appears to be the reduction of threat to shipping from such activities, however it is clear that of central import is the potential impact on global trade flows. The main objective of the Code is:

“To establish an international framework involving co-operation between Contracting Governments, Government agencies, local administrations and the shipping and port industries to detect security threats and take preventive measures against security incidents affecting ships or port facilities used in international trade”(International Maritime Organization, 2003:6).

The implementation of the framework is said to depend upon a *standardised* and consistent approach that evaluates potential risks. Tellingly, the consistency and standardisation of approach, echoes the networked geographies of global trade, and thus the potential of networked threats, as we will see in *Part Two*. This networked configuration means the Code itself is part of a wider apparatus of territoriality, including the U.S. Department of Homeland Security’s Container Security Initiative (CSI). In line with the ISPS Code the CSI also seeks to identify “optimal trade lanes and ports” which may be prone to infiltration (Office of Policy and Planning and Office of International Affairs, Container Security Division, 2006:5). Central to the CSI is the process of pre-

screening containers before they enter U.S. border space, projecting the border beyond the territorial confines of the physical boundary or ‘seam’ of U.S. territory, a method that Cowen describes as “extraterritorial” (2010:605).

Structured according to mandatory and non-mandatory procedures for reducing security threats the ISPS Code stipulates a variety of measures which ships and port facilities must adhere to, such as “identification of weaknesses, including human factors, in the infrastructure, policies and procedures” as part of the ship security plan, through to the prevention of unauthorised entrance to port facilities (International Maritime Organization, 2003:13). Ships and port facilities alike must hold to a three-level security plan set by Contracting Governments, however, according to the Code the security must always be set at level 1, indicating the assumption of a permanent state of security (Cf. Agamben, 2005). Following Cowen’s notion of CSI’s extraterritorial projection beyond the container border of the United States it is clear that the logic of internal and external security provision becomes problematised. This is furthered by the networked geographies of global trade itself, for a strict separation between inside and outside would negate the interconnectedness of logistical knowledge, hence my rendering of contained continuity. However, whilst Cowen’s (2010:603-605) argument concerning the role of “seam space” highlights the complexity of contemporary border practices, the ISPS Code still outlines the divisions between internal and external features of the logistical infrastructure. So, where the material defences of security gates, container seals, or surveillance systems offer protection through partitioning space this is preceded by the identification of such devices in the ISPS Code. In a prescient example the Code clearly articulates such a model of interior/exterior. In the section on port security the distinction is raised between port facilities, and those spaces adjoining them as areas that might be used as potential points of infiltration. According to the code these “structures adjacent to the port facility [...] could cause damage within the facility or be used for the

purpose of causing damage to the facility or for illicit observation of the facility” (International Maritime Organization, 2003:78). This illustrates the strategic differentiation between the port facility as legitimated and the adjacent space as illegitimate. In terms of the spatial reconfigurations outlined previously, we can see the inherent link between geographical decoupling, infrastructural interconnectivity, and security: strategic, logistical advantage is inscribed in all of these.

The protection from, and identification of, risk and vulnerability is a recurrent theme in the ISPS Code, with suggested measures including surveillance equipment as well as permanent barriers. Amid the detailed language there are distinct phrases that attest to the relationship between interconnectivity and potential infringements that may curtail it. Echoing the remit of logistics and supply chain management’s emphasis on continuous flow, it is stated how important it is to protect infrastructure, in particular those infrastructural devices that produce flow, be they “accesses, entrances, approaches, and anchorages, manoeuvring and berthing areas” as well as “bridges, railways [and] roads” (International Maritime Organization, 2003:77). Likewise, movement is sacrosanct in the port space and its ongoing operation is dependent upon allowing those sanctioned as internal to the system to operate without hindrance: it talks of allowing “individuals to remain within the port facility without challenge” (International Maritime Organization, 2003:83). However, entry is only possible once the individual has been given appropriate clearance, deemed acceptable, that is, to the operation of the system (seen with the pager system at London Thamesport). By contrast movement is blocked for those actors not reasoned appropriate – the Code states that a port security plan should provide the “means of impeding movement through the remaining access points, e.g. security barriers” (International Maritime Organization, 2003:83). Here then is the crux: those actors identified as critical to the distributive system are promised unimpeded movement; those not, are blocked, and limited by architectural and non-architectural impediments.

Amidst the minutiae of endless protocols perhaps the most illuminating phrase that one can take from this document is the need to “enhance control” (International Maritime Organization, 2003:89), a blatant statement of the ideological foundations of logistics and supply chain management, and its wider securitisation.

Logistical Power: Towards a Critical Politics of Infrastructural Control:

The importance of infrastructure seen with the previous examples testifies to the spatio-temporal configuration of supply chain geographies. These illustrate how controlling the interactions or adjustments between the various ‘tunnel effects’, making them “as seamless an experience as possible” (Graham & Marvin, 2001:358), can provide retailers, shippers, freight forwarders, and logistics and supply chain operators with time, and thus cost, savings. Cowen rightly suggests that the calculative practices of logistics enforce “market logics on social and political problems” (Cowen, 2010a:602). The root of this market-driven control resides in my own reading of logistics as the means to *structure, manage and control the knowledges, technologies and practices of interconnection and flow in order to promote specific mobilities*: those of sanctioned commodities, peoples, knowledge etc. This critical conception of logistics refers to the relationship between governmentality and geography, supplementing this with the ability to control interconnection and flow for the twinned-purposes of contained continuity. We can term this *logistical power*. I address this through discussing—at the close of this section—the infrastructure of logistical violence. By this I suggest that there is an inherent bond between military and commercial forms of logistical power, elicited through the function of infrastructure, most notably that of the ‘line’ of supply and logistics ‘pipeline’.⁷⁰

The sources of logistical power can be determined if we move beyond the Council of Logistics Management’s description of logistics, and utilise DeLanda’s characterisation of logistics as a “distributed system of control” (DeLanda, 1991:123). Of vital importance to this approach is the *distributed* nature of power, facilitated by infrastructure. The infrastructure of *contained continuity* implies even greater power, in

⁷⁰ This follows Foucault’s assertion regarding the notion of the ‘highway’. He argued that the roadway heralded the market-driven control of space (Foucault, 1996:106), whereby the marking-out of territory for commodity movements instantiated a specific ideology of space as compliant (also see Deleuze, 1999:42). The malleability of space, as suggested by Foucault, takes on added significance when we consider the embedded nature of infrastructure. The links to the discussions in *Interlude I* are clear.

terms of the ability to spread across territorial bounds (Mann, 1993:59). So, distribution could be termed a twofold concept: located firstly in the triumvirate of production-distribution-consumption; and secondly, implying the ability to reach beyond a centralised point of control, thus spreading control throughout global logistics and supply chain networks. As such we might conceive of distribution in the first case as placed: that is, located within a certain framework between production and consumption, but in the latter it *displaces* a specific location and seeps across a variety of territories. To be exact, logistical power is distributed *through* infrastructure. This dual conception of distribution is a useful guide in fostering further consideration of logistical power and infrastructure. But focusing on the latter notion of distributive reach provides even greater potential. This imparts both an idea of reach as a form of extension, as well as implying that reach itself is distributed through specific means: again, via infrastructure.

John Allen, in his exploration of the geographies of power, terms such apparatuses, *mobilisations* of power (Allen, 2003:38). Namely, social power inheres in the work that goes into projecting, implementing or mobilising it. Infrastructure is a form of spatial control itself, rather than a *function* of such control. So, logistical power resides at every spatio-temporal, material node: the maritime lines of communication, the road junctions, the container ports, the distribution centres, the containers, the container corner-fittings, the gantry crane spreader bars, the pager systems, the software loading programs etc. Allen's rendering of power's mobilisation stems from the work of one of the most significant critics of infrastructural power, Michael Mann. In his seminal works on the subject (Mann, 1986a; 1986b; 1993; 2008), he differentiates between forms of despotic power, like the coercive, direct control of a population, and that of infrastructural power as the specific means to execute and *mobilise* such actions (Mann, 1993:59; also see Driver, 2004:8-9; Jones, 1999). Both despotic power and infrastructural power are distributive in their nature: they direct power from one social group to another

at the expense of one group (Mann, 1986b:6-7; 1993:2-3).⁷¹ Central to Mann's thesis is that power is *coordinated* and channelled through forms of infrastructure (Mann, 1986b:477), and depends on “*conduits* for the transmission of all kinds of organizational and institutional ability” (Allen, 2003:47 emphasis in original). Although Allen's notion of conduits is not fully outlined, as with my critique of the logistics pipeline I take this to refer to the *material* means of projecting power through the design of infrastructure (Mann, 1986a:117). Like Graham & Thrift (2007:10), for Allen the presumption that social power can be successfully transmitted from one institutional body to another in an effortless fashion fails to consider the mechanisms through which this is possible—without doing so one falls into the trap of assuming that power is ‘natural’ (Allen, 2003:34). This is where Mann's work has proven invaluable. He identifies four areas of infrastructural strength: organisation, control, logistics and communication (Mann, 1986b:2; also see Mann, 1986a:117). Fundamentally it is argued that these offer states the ability to “organize and control people, materials and territory” (Mann, 1986b:2-3). The latter two (logistics and communication) demonstrate how socio-cultural development is intrinsic to forms of organisational control. For example, the role of literacy can be read in terms of the transmission of messages across territory, “enabling legal responsibilities to be codified and stored” (Mann, 1986a:117); systems of exchange such as weights and measures, and coinage promote a stabilised form of trade; and finally (and most decisively for my argument) is the development of communication and transportation technologies for the transmission of people and goods. All are “logistical techniques which have aided effective state penetration of social life” (Mann, 1986a:116).

However, the mechanisms of infrastructural strength identified by Mann constitute specific forms of *infrastructural* power, rather than representing a generalised

⁷¹ In this sense Mann's use of the term ‘distributive’ differs from my own: he uses this to refer to certain forms of social stratification, whereas my own reading of distributive power is closer to Mann's concept of infrastructural power. As a result my focus is on the spatiality of distributive reach as a form of infrastructural power above all.

version of power. In doing so he outlines four sources of social power: ideological, economic, military, and political (Mann, 1986b:2; Allen, 2003:49).⁷² Each of these is differentiated by their modalities of infrastructural strength, as well as their reach (Mann, 2008:358). With ideological power the communicative range of such psychological influence can extend territorially beyond the reach of the economic, military and political, i.e., it is extensive in its ‘tentacle-like’ seepage. It moves through material infrastructures such as communication networks, although it also less materially defined in its ability to be transmitted through word of mouth communication for example. By contrast economic power is more intensive in its mode of operation, demonstrated by the extraction of natural resources from the land, or the controlled ‘mining’ of labour from a population. Economic power also accounts for extensive and diffuse forms of infrastructural reach. These include the distributed nature of supply chains and trade conduits, as well as globalised financial instruments. Military power again represents a dual form of reach, intensive in terms of its ability to draw action out of subordinates, but extensive in terms of projecting power over geographical territory through weapons technology for instance. Given the specific focus of the arguments in this chapter I would add to this, the importance of logistical lines of supply. Finally, Mann (2008:358) argues that political power is primarily determined by “territorially centralized regulation of social life”, adding that in inter-state terms its centralised power is distributed through “geopolitical relations”.⁷³ Each exemplifies differing forms of infrastructural reach, i.e., through the means they are mobilised. Mann suggests that they overlap and often share the same material infrastructures of roads, rail networks, communications etc. However, they are utilised in different ways (Mann, 2008:358). This is further emphasised by his

⁷² Mann (1986b:2-3) refers to this as the ‘IEMP’ model of social power.

⁷³ Mann adds that he does not conflate military and political forms of power, as thinkers such as Weber have suggested. Part of his rationale for this argument is that non-state entities also wield military power. Further to this, and more significantly for the arguments addressed here, is that political power is “routinized” (Mann, 2008:358), in contrast to military power, which could be described as reactionary. But of course more recent forms of military power are pre-emptive (Tomlinson, 2007:61).

characterisation of the differences between military/political, and economic power; notably, military and political forms of power are determined through “authoritative power” (Mann, 1993:6) in the guise of a centralised command structure ‘projecting’ power to a group of ‘subordinates’ as he terms them. By contrast the “diffused power” (Mann, 1986b:8) associated with economic might “spreads in a relatively spontaneous, unconscious, and decentred way” (Mann, 1986b:8).⁷⁴

Although there are obviously distinct mobilisations of power in each case (most notably in relation to the decentralised notion of ‘disorganised’ capitalism (Lash & Urry, 1987)), it is rather telling that the inherent bond between the military and the economic constitution of logistics and supply chain management is not fully pursued, especially in light of the shared infrastructural heritage of each. Although the spontaneous spread of economic power may indeed be prevalent within the networks of virtual transactions these still rely upon specific forms of computational infrastructure. And more pointedly, as this chapter has argued, the infrastructural apparatus of commercial logistics delineates a decidedly conscious approach to the distribution of physical goods for example. So, whilst Mann does consider the relationship between the infrastructural power of logistics in both the military and economic contexts, he differentiates between them by identifying the authoritative power of military power as distinctly logistical in its constitution, then describes the diffused power of the economic as a form of “universal infrastructure” (Mann, 1986b:10). In contrast to the typically material infrastructure of military power he sees universal infrastructure as the development of markets, national identity, literacy and other culturally dispersed mechanisms such as social class. What is decisive to my own argument is where the convergences reside, namely through a shared approach to infrastructure. My key argument being pursued here is not quite so much the entities which populate the specific forms of infrastructure, rather that these self-same

⁷⁴ Mann’s argument here stands in contrast to the position developed by the likes of Dicken (2011) on the controlled decentring of global economic processes.

infrastructures hold multiple potentialities.⁷⁵ As we have seen in the previous chapter the development of standardised mass-production technologies for consumer goods was a direct result of the manufacturing techniques developed in weapons production (DeLanda, 1991). We also saw how the shipping container has been utilised in military campaigns for some period (Levinson, 2006:171-188; also see Bates, 2005), thus suggesting the adaptability (or ‘openness’) of this technology to military and economic purposes.

This contention follows Virilio’s suggestion that the logistics of implementation is predicated on a system of vectors, i.e., paths or trajectories along and through which power is exerted. The critical factor for Virilio is that such vectors embody a variety of functions, so that “the trucks bringing ammunition and the flying shells bringing death are coupled in a system of vectors, of production, transportation, execution” (Virilio & Lotringer, 1997:23). This generates a telling line of argument, whereby the coupling of military power and logistical knowledge in the form of governing mobility is evident. Control over the trajectory of the bullet parallels the arrangement of supply line flows of information and provisions (Virilio, 2006b:39). Likewise, military logistics is founded on the capability of delivering the potential of attack through the control of space-time. For if the enemy believes that the opposing side has the means to effectively move bodies and objects then they also have the means to attack wherever and whenever they have the desire to do so:

“Thus, it is above all a new idea of violence that no longer comes from direct confrontation and bloodshed, but rather from the unequal properties of bodies, evaluation of the number of movements allowed them in a chosen element, permanent verification of their dynamic efficiency” (Virilio, 2006b:62).

⁷⁵ The notion of multiple potentialities will become a decisive line of argument in *Part Two* of the thesis. But it should also be noted at this point that the ‘openness’ of infrastructures to different forms of usage includes the contentions raised here on the implementation of violence, as well as the infrastructure used to implement humanitarian aid efforts (Van Wassenhove, 2006).

Above all then, one of the roots of logistical power lies with the ability to control and sustain movement through the identification, design, construction and securing of the most advantageous routes. For Virilio this elicits a form of ‘violence’ that is not solely premised on direct, affective engagement but also with the ability to mobilise the threat of violence, thus extolling a form of violence as *logistical*. Of course, such a forthright claim has to be unpacked, particularly as it implies the union between mobility and the infrastructure of logistical violence.

Violence can be a form of gestural affect, that of civil unrest, crime, mass-murder or terror (see Balibar, 2009). It is identified with a wilful assault on the physical or political body, through individual aggression, or more concentrated, lethal military power (Mann, 2008:358). However, Mann’s assertion (one which evokes a seemingly popular view) regarding the lethality of *military* violence partly fails to address how violence also operates at a level that is less immediately verifiable: that of language or security for example. These are forms of violation that demonstrate the multiplicity of violence (see Abel, 2007:2). In contrast to individualised or militarised renderings of violence, Benjamin (1999b:280) situates the question of violence with the state, noting how this is concerned with justified legal ends (also see Tilly, 1984:56).⁷⁶ Structural in tone, this posits the deeper and more complex concept of violence as a form of *indiscernible* instrumentalisation of the individual subject. To be sure, one way of approaching the discussion of violence and its mobilisation is once again through the question of visibility and invisibility—with the immediately verifiable effects of individual violence, be they physical injury or damage, but equally the imperceptible mechanisms which produce the more visible manifestations, that is, the infrastructure of mobilising violence. Žižek’s work in this area has described the most visible articulation of violence as *subjective*: those modes of overt, identifiable aggression (Žižek, 2008:2). One could add to Žižek’s position

⁷⁶ As outlined above, this differs from Mann’s distinction between military and state forms of power.

that the subjective expressions of violence are similarly the most mediated, in that they are often spectacularised in their representations in the media for example (see Jay, 2003:2). However, in terms of the indiscernible production of instrumental modes of control Žižek elaborates on this by identifying an *objective* background that is said to precede the subjective forms (also see Balibar, 2009:22). Objective violence is defined by two categories: symbolic and systemic. For Žižek symbolic violence is most readily seen through language and other representational forms, whereas systemic violence accounts for “the often catastrophic consequences of the smooth functioning of our economic and political systems” (Žižek, 2008:2). The imperceptibility of systemic violence is perhaps the dominant one, for it does not project the discernible representations of the symbolic, rather it *appears* to be the very constitution of the normative functioning of sovereign power. Systemic violence then is a form of domination whereby the structures of power are enacted in order to posit the symbolic or subjective forms as the visible expressions of violence. Again, the infrastructure of mobilisation is central to this—for as described throughout this chapter the functioning of logistical power is often ‘naturalised’ through the black-boxed status of infrastructure.

This can be developed a little further by refocusing the relationship between the subjective and objective in terms of the *non-violent*. Subjective forms of violence are measured against a ‘norm’, which is deemed to be non-violence. In this sense the eruption of violence is seen as a moment of abnormality in comparison with the typical functioning of non-violence (not unlike the purified separation of order and disorder). However, Žižek insists that such a “non-violent zero-level” (Žižek, 2008:2) masks the operation of the objective forms of violence – i.e., the norm is not non-violence, but rather the imperceptible functioning of the economy and politics as objective violence. The visibility of subjective violence camouflages the substrata of systemic violence. He contends: “objective violence is invisible since it sustains the very zero-level standard

against which we perceive something as subjectively violent” (Žižek, 2008:2). Systemic forms of violence, then, imply the deep-seated roots of violence as constitutive of all capitalist forms of power. Moreover, the systemic operates through invisible modes that structure the operation of such forms. As the ‘base’ of violence one might suggest that the systemic acts as an *infrastructure* of violence, a claim which aligns with Virilio’s argument concerning the militaristic function of all logistical formations: they structure the very mechanisms of domination. Further to this we can appreciate Virilio’s assertion that violence is not solely expressed through direct attack—it is also the *organisation* of violence (also see Vidler, 1993:85). The organisational power of logistics is indeed emblematic of systemic domination, and of the practical realisation of spatio-temporal control and order. Thrift develops his discussion of logistical power by noting how such mechanisms “are founded on the systematic *delivery* of violence” (Thrift, 2008:199 my emphasis). Although his argument is ultimately focussed on ‘softer’ modes of violence in the urban realm Thrift’s suggestion is clear: the ability to structure violence, or to *mobilise* the technology of violence, is an inherent formula of violence. The mobilisation of violence is a form of violence in its own right.

This posits the mobilisation of subjective, visible forms of violence through the often-invisible systemic infrastructure of logistical power. Given this it is vital to engage further with how mobilisation occurs. The nexus of accelerative culture—via increasing speed—can be read as a form of violence through the *exploitation* of motive energy. The domestication of animals through the harnessing of the motive power of the mount, up to the technologies of remote drone aircraft: all attest to the exploitation of speed for military as well as commercial gain. In historical terms Virilio describes a form of ‘zoophilia’—what might be thought of as an appreciation of the potential for acceleration beyond the limitations of the human body, and the harnessing of other motive forces, such as the saddled animal (Virilio, 2006a:39). Here Virilio is highlighting the relationship

between optimum efficiency, speed and the control of movement for political, military and commercial purposes. It is part of an extended network where breeding, agriculture and technology enact forms of control and utilisation for the purpose of accelerated movement. In this scenario there is a twofold form of distribution: violence distributes speed through systemic structuring, and the infrastructure of logistics distributes military violence beyond its origins, or as Virilio suggests “the steel that stretches out in front in the sword, in the lance, in the knife as in the rail, is like the road, that disappears over the horizon in a movement of shock and distancing, signalling one violence, one terror” (Virilio, 2006a:48). The road is as powerful as the shaft of the sword.

Conclusions:

The suggestion that logistical power is a form of violence may at first appear somewhat exaggerated in light of spectacularised acts of subjective violence. However, as this chapter has attempted to outline, logistics and supply chain management represent extremely powerful ideological systems which structure specific conditions of capitalist space-time. At the root of this reading of logistical power and infrastructure is the shared legacy of military and commercial domination. Both can be said to symbolise the preparation, organisation, and control of movement. Both are also characterised by the attempted elimination of friction in the case of military logistics, and the reduction of wasteful inefficiencies in the commercial context. As I argued in the section on military logistics, this could be said to advance specific forms of action: that of *implementation*.

Where do these points leave the discussion of commercial logistics? Perhaps most significantly they highlight the central function of logistics and supply chain management as the will to produce a *continually flowing system* (Cf. Paché, 2007). This chapter has attempted to situate how this is mediated through infrastructural control in particular. In approaching this line of inquiry the metaphorical elaboration of the logistics pipeline highlighted the notion of contained continuity: that is, how continuity is produced via forms of containment. As with the discussion of the packaged efficiency of the shipping container, this is concerned with shaping action. My argument was that purported fluid forms of flow through the logistics pipeline naturalise the extremely powerful infrastructural apparatuses that power logistical mobilities. It was here that the central function of infrastructure becomes apparent: this almost invisible apparatus camouflages the strategic points of interaction between the various parts of the logistics system, including the physical infrastructures of road, rail and sea networks, as well as rail terminals, sea and air ports, transport vehicles, ICT channels, distribution centres, and warehousing. Central to this approach was the issue of *adjustment*, as identified by Graham

and Marvin (2001). Given this, the adjustment or switch can be deemed an extremely significant tool of contemporary logistics. This was demonstrated through the example of the EU 'Motorways of the Sea' initiative, where the economic outlay necessary to improve the flows of commodities through the road networks of the European mainland was considered too expensive. An alternative mode of adjustment was needed; one that afforded continuity through the designation of a 'natural' infrastructural apparatus. This example also demonstrated how supply chains must be (re)configured in order to promote the *continuity* of trade flows and overcome the potentially economic crippling implications of wasted time.

These notions of interconnectivity and flow present a significant problematic in relation to the governance and securitisation of such networks. An emerging issue is that increasing interconnectivity results in the growing complexity of connections. For advocates of global trade circulation the need to protect and securitise "good circulation from bad circulation" (Dillon, 2005:3) cannot be over-determined so that the flows are curtailed. Securitisation as an attempt to stabilise interconnection holds within it the potential to stymie connection. As a result the over-securitisation of flows in the form of immovable barriers to the movement of trade, for example, are simultaneously contested. Thus we saw how the *containment* of movement, in the securing of infrastructure at port spaces, is coupled with the *continuity* of movement for sanctioned flows. These intertwined logics of interconnection are determined by a precarious balance between the apparent openness of supply chain flows, and the potential stasis of securitisation.

The growing sophistication of logistical knowledge demands further engagement with the strategic political power to manage and limit the geographies of circulation and interconnection, be it commodities or populations. For although such knowledge has been central to the production and distribution of military capabilities, the reach of commercial logistics is continuing to increase as a growing body of critical scholarship on

logistics acknowledges. Indeed given the development of management strategies such as 'Lean Six Sigma', attempts to limit variability are being seen (Cf. Czerwinski, 1998). The implications of such approaches for how space-time is not only viewed, but constructed and secured are decisive. As the discussion of security strategies outlined, the pre-planning regimes of approaches like the ISPS code, and the Container Security Initiative highlight the geopolitical importance of pre-emptive planning (Anderson, 2010), an issue also dealt with in *Chapter Three*. In pre-empting possible impediments to the efficiency of the supply chain network it is clear how the securitisation of interconnection is never a posthumous reaction but rather immanent to the very interconnectedness of the network. Again, this foregrounds a specific set of knowledges synonymous with space as calculable, orderable and controllable.

One last point deserves emphasis: as with the concealment of infrastructural prowess the omnipotent power logistics has within the serpentine constitution of global capital is premised in part on the hidden computational control of territory and temporality. The often concealed nature of control is important as the totalising effects of logistics might be described in terms of Virilio's notion of 'pure war' (Virilio & Lotringer, 1997). He sees 'pure war' as the militarisation of everyday life, and it is tempting to extend this from the context of the military to that of the commercial, and claim that 'pure logistics' is the *organisation* of everyday life under the logic of capital (Cf. Thorpe, 1986). This totality of control, the 'veiled' presence of logistical domination, may indeed account for the lack of awareness, or indeed the straightforward acceptance of commodity movement and the wider spatio-temporality of consumer capitalism. The speed and efficiency of commodity movement, as well as the purported instantaneous appearance, seems to depend on the invisibility of commodities in transit. Because of this purported effortlessness of commodity movement, the power that logistics appears to wield is the means to *shroud* the work that is involved in distributing commodities. It is

here that the work of scholars such as Mann continues to offer a productive vantage point to critique the mobilisation of power in all its forms, but in this case, that of logistical power.

Part Two

Interlude II:
Turbulent Relations

Introduction:

“The essence of life is to be found in the frustrations of established order” (Whitehead, 1968:87)

Whitehead’s comments speak to the inherent relationship between creative change as the wellspring of life, and the disputation of a singular order. Whilst we saw early in *Part One* that critiques of singular order are more readily associated with modes of multiple orderings, in this chapter I turn to the immanent fallibility of such modes. As *Chapter Two* in particular articulated, the control of this space is mediated by highly sophisticated means to protect the logistically governed flows of commodities. There are, however, traces—important traces—of fallibility, hinted at most obviously by the very need to secure distributive space through such means as container twist-lock mechanisms or more potently the securitisation of global maritime infrastructure. This suggests the presence of systemic weaknesses. But more fundamentally it problematises the very notion of *order*, per se. There cannot be permanent stability: rather, all forms of connection will be ‘undone’ or, in terms of the arguments raised in this interlude, *destabilised*. This problematic is specifically dealt with here.

In particular this section addresses the entanglements of order and disorder in all systemic environments. In doing so the intention is not to argue in favour of a binary shift from order to disorder, it is to maintain that the two cannot be separated at all, both immanent within the other. Such a conjunction of order-disorder speaks to approaches that address the friction, messiness or error present within global systems of mobility, and beyond (Adey, 2006; Cresswell, 2010; Roberts, 2011; Tsing, 2004; Turnbull, 2000:1-17). As Cowen observes, “a system built on the speedy circulation of cargo through smooth space also entails new forms of vulnerability. Disruption is the Achilles heel of global logistics systems” (Cowen, n.d.). Further to this, the notion of error can “overturn our keenest desires for order, optimisation, and purity. Error is the beautiful

improbability that escapes the fortifications of logic” (Easterling, 2005:124). Although the consideration of such activities may appear tainted by a certain macabre quality, the intention is to address what Latour calls “the troubling exceptions” (2005:35) which account for both stability and instability. Similarly Graham (2010) also describes the value in studying the accidental or intentional dissolution of systemic stabilities (also see Trentmann, 2009). As outlined in *Part One* the mobilities of distributive space are, in part, governed by a variety of means to modulate such error, attempting to make space legible and calculable. However, I want to address how the interactions of the network are inherently unstable. I suggest that interconnectivity is both a decisive factor for global commodity mobilities but also an example of structural fallibility.

In this interlude the intention is to establish a conceptual foundation on which to build the later discussions concerning the immanent disruptions of distributive space. The overarching theoretical means of constructing this foundation comes from an interlinked body of work, most clearly grouped under the moniker of ‘complexity’. The interlude begins with an outline of the overall scope of complexity theory, before more thoroughly addressing the work of chaos theory, with a particular focus on the notion of turbulence and disorder. The argument developed here is not that order and disorder are separate, rather that they are ever-present, i.e., there can never be pure disorder. Therefore I attempt to situate the order/disorder conjunction. Indeed, we shall see in the next two chapters how “disruptions and disturbances have the potential for generating more complex orders” (Michael, 2000: 28; also see Graham & Thrift, 2007:5). As will shortly become evident, the key argument to emerge from these debates is that of *relationality*. Whilst the issue of relation and interconnectivity have been an important focus of *Part One*, here the relational is discussed as a form of transformative emergence, where the perceived ability to predict the outcomes of such relations is overturned. Added to this, the emergent nature of relationality highlights the localised, unique

qualities of interconnectivity. The final debates to be addressed come out of more recent engagements with many of these arguments, grouped under the term ‘assemblage theory’. This approach is developed in order to critique, once again, perceived systemic totalities. In doing so the section highlights DeLanda’s focus on the ‘capacities’ of relations to strip away the “strict reciprocal determination between parts” of a system (DeLanda, 2006:9).⁷⁷

Growing Complexities:

Dillon (2005) has highlighted the increasing complexity of globalisation in terms of growing interconnectivity. As posited in the previous two chapters the stabilisation of the geographies of interconnection was a critical facet in the development of intermodal containerisation, and the resultant spatio-temporal control seen with logistics management. That interconnectivity holds such a critical function for the global flows of commodities is exemplified by the argument that “in a systemically interdependent world everything is connected or, in principle, is able to be connected, to everything else” (Dillon, 2005:3). Whilst the logic of interconnection clearly attests to the ordered mobilities of distributive space, in this interlude I begin to argue that subsumed within the same rationale is the immanent presence of disorder (see Graham, 2010; Harris Ali & Keil 2010). Given the growing complexity of interconnection, both qualitatively and quantitatively, there is an attendant intensification of the specific *types* of interconnection. If there is a significant shift in the logic of interconnectivity (and this case has been made in the previous two chapters), then we have to be aware of how this is situated in terms

⁷⁷ There is a caveat to be briefly discussed. That is the relationship between the theoretical tools developed by the physical sciences and their application to the social sciences. In the social sciences (and humanities) the notion of chaos may be said to have helpfully situated critical approaches to totalising world-views. Hayles (1990:15) argues that yes, chaos theory has undermined the Newtonian perspectives on mechanistic thinking, but however, chaos theory may also be said to “tame the unruliness of turbulence by bringing it within the scope of mathematical modeling and scientific theory”. Given this, we do have to be cognisant of the pitfalls of such cross-disciplinary conjoinings, but equally the work developed within assemblage theory in particular offers potentially valuable means to appreciate the entanglements of order and disorder.

of differentiating ‘good’ interconnectivity from ‘bad’ interconnectivity. Although the premise being made in this section, and in the following chapters, is that such differentiation defies the ontological status of relationality, it is clearly evident from the politics of logistics and securitisation that the separation of the two is part of the wider dogma of distributive space. Instead, I want to posit the complexity of interconnectivity by arguing that the securitising impulse seen in the previous chapter cannot permanently and universally override the entanglements of order and disorder.

Perhaps the most useful place to start the discussion of the entanglements of order and disorder is with the field of complexity theory. Although already widely disseminated (see for example Byrne, 1998; Cilliers, 2005; Dillon, 2000; Thrift, 1999; Urry, 2003) this approach offers a valuable articulation of the *relations* between order and disorder. Indeed, complexity theory might be said to represent “a shift towards understanding the properties of interaction of systems as more than the sum of their parts” (Thrift, 1999:33). Rather than the individual units of a system providing its substantive identity, it is the *process* of relation that accounts for the existence of the system. With such a scenario there is a move toward the relational: ontologically, epistemologically and methodologically. Dillon’s reading of both complexity theory and post-Structuralism emphasises, what he terms, a “radical relationality” (Dillon, 2000:4). That is, they posit the world through the very condition of being-in-relation. In terms of the science of complexity Dillon (2000:9) argues that traditional modes of accounting for the natural world are overturned by theories of complexity. As we saw in *Interlude I* Newtonian thought maintained that the means used to observe the natural world did not affect the matter being observed, as matter was seen as pre-formed, and inert (also see Latour, 1987:91). Likewise, for Dillon, this is the taxonomic model of categorisation—given the supposedly passive nature of matter it was not subject to continual change and thus categorisation was possible. But it is argued that complexity’s emphasis on

temporality challenges stability and predictability. Formative processes of change destabilise the supposed authority of categorisation. This is where the relational becomes emblematic of complexity theory. According to Dillon's reading of complexity, if, for example, we take the human body, the attempts to permanently categorise a certain species will be undone through the process of formative relation, via "infiltration; distribution; infection; contamination; mutation; colonization; symbiosis" (Dillon, 2000:9). In these processes of relating there is an emphasis on ongoing change, as opposed to pre-formed stability.

Rather than the system being constructed from stable units or parts that are determined through controlled, stable relations, the ontological status of relationality demands that the "in-formation" (Dillon, 2000:9) nature of relations is recognised. This is telling in terms of our previous discussions concerning the controlled interactions (read relations) of container movements. Complexity theory further stresses that the process of relation is *emergent*: that is, the actual interactions cannot be predetermined through the individual units themselves. As an emergent formation the system is not governable by the properties of the units alone, but rather through the ongoing encounters between the units. Emergent properties are 'unfolding' as opposed to predetermined causal relations (Byrne, 1998:14). A key distinction between the two is that of non-linearity. Linear systems are said to be causal in the sense that a specifically sized input will generate a concurrently sized output. In non-linear systems this is not the case. A small input can generate massive outputs. For example, one may think of how the decision of a car driver to reach for their mobile telephone on a crowded motorway may result in the catastrophic consequences of a motorway pile-up. For Urry the critical aspect of emergence is "not that the sum is greater than the size of its parts – but that there are system effects that are somehow different from its parts" (Urry, 2003:24). This leads to the relational interactions of the individual units producing the complex 'whole'. Of

course, the scare quotes denote the problematic nature of wholeness: such an assumption of the interactional relations between units appears to privilege the causal effects that are counter to emergence. As Urry (2003:25) again notes, the interaction of individual units is spontaneous and as such is contra the notion of wholeness. Instead, the stability of relations is problematised and the ongoing, processual assemblage of relations is promoted.

Turbulent Chaos:

Whilst the differences between complexity theory and chaos theory, as described by Thrift (1999:61 n.4),⁷⁸ are to be appreciated, there is one area that might be said to link them: that of turbulence. As a conceptual and analytical tool the application of turbulence to social theory also reflects wider debates emerging from complexity theory, as already noted (Urry 2003); dynamical processes (DeLanda 2002); assemblage theory (to be discussed later in this interlude) (DeLanda 2006; Robbins & Marks 2010); and political theory (Bennett 2010; Connolly 2011). These various approaches explore contingent, processual, and heterogeneous formations that are unpredictable. They embrace the entanglements of ordering practices and clashing alternatives. In practice, all attend to non-binary approaches to socio-spatial relations. Thus, it is not simply the case that order or disorder prevails, rather turbulence produces new forms of complexity.

More broadly, the concept of turbulence has entered the popular lexicon through association with global economic collapse (Brenner, 2006), or environmental disaster (Massumi, 2011b). A reflexive exploration of the impact of turbulence on global politics, for example, was Rosenau's *Turbulence in World Politics* (Rosenau, 1990). Here Rosenau presents a new model of global politics in a post-state-centric world, where the state has been replaced, or at least supplemented, by a number of other spaces of political

⁷⁸ Thrift suggests that complexity incorporates the earlier concepts emerging from chaos theory.

authority. He notes how traditional forms of authority have become weaker, how previously important collectivities have fractured and how small groups have become more powerful, in terms of their potential to effect change. In particular Rosenau situates turbulence within the rubric of organisation theory, addressing wider models of complexity, most critically (as we saw with Dillon's argument and the debates in *Interlude I*) where the increasing interconnectivity of the post-state-centric global system fosters the potential for "these interconnections to fluctuate more frequently and more rapidly" (Rosenau, 1990:59). Interconnectivity is potentially fallible in the face of higher-order complexity: that is, instability is immanent to the increasing interconnectivity of the global. Such accounts mobilise turbulence in similar ways to the everyday or popular definitions. Flexibility, threat, openness, and uncertainty are all part of the equation, as are disorder, complexity, randomness and lack of predictability.⁷⁹ At the same time it refers to a feeling of things being out of control; unruliness; or a breakdown in traditional ways of thinking and being. But Rosenau's approach jettisons the overtly populist notions by outlining how the possibility exists that "appearances are deceiving, that all disorder we observe is, in fact, ordered, if not orderly" (Rosenau, 1990:48). In arguing this, Rosenau is embracing the specific theory of turbulence developed in the physical sciences and mathematics, where the turbulent emergence of disorder does not simply lead to catastrophic breakdown, but can lead to higher levels of order.

The scientific theory of turbulence (and chaos more widely) directly interrogates the relationship between systemic order and disorder. Where Newton identified an implicate order in his mechanistic constitution of nature, Poincaré's work in the late 19th Century on linear equations demonstrated the limitations of this method in accounting for nonlinear problems (Hayles, 1990:2). Other precedents include the work of René

⁷⁹ Recently there has been evidence of more 'open' approaches within theoretically attuned readings of logistics (Aastrup & Halldórsson, 2008; also see Wilding, 1998). But as with military interest in non-linear dynamics (Czerwinski, 1998) this is formed around ways in which complex dynamics can be put to work in the interests of improving the system.

Thom, who, in the 1960s, developed his theory of catastrophes (Thom, 1975). According to Brady (1990:65) Thom's work signalled a momentous shift in the mathematical understanding of discontinuous processes, as opposed to the study of continuous processes under calculus. As Hayles usefully discusses, it was not until the 1960s and 70s that further articulation of dynamical systems would come to benefit from the potential offered by increased computing power. But Hayles also maps a concurrent shift in the focus of the philosophical trajectories of poststructuralist thought.⁸⁰ As with the critique of master-narratives in the work of Lyotard (1984) this body of work demonstrated "a break away from universalising, totalising perspectives and a move toward local, fractured systems and modes of analysis" (Hayles, 1990:2). In doing so one can situate a paradigm shift towards an appreciation of the disorderly, the fractured, the chaotic and the turbulent. Not simply as a binary opposition, but as a productive dimension in social change. However, as the theoretical basis of turbulence so aptly demonstrates this is not simply a relativistic embrace of the turbulent, but signals the increasing complexity of social modes of ordering. This shift in perspective views chaos as order's immanent other as opposed to its opposite (Michael, 2006:145). But the conceptualisation of the order/disorder conjunction is somewhat problematised by the viewpoint taken. As Brady suggests there are competing stances as to the emergence of order or disorder (Brady, 1990:66). On the one hand where seemingly random, turbulent processes are apparent there is an underlying sense of order; on the other, where order appears prevalent there is disorder. For Brady (1990:66), perhaps the most efficacious means to navigate this apparent dichotomy is to argue that "appearances of order or disorder often conceal their contrary". Hayles develops a similar reading of chaos theory that identifies two branches:

⁸⁰ Inevitably there is a process of translation in operation when theoretical tenets from the 'hard' sciences are employed in the 'soft' sciences. However, Hayles notes the important relationship between the theoretical tenets of the social and physical sciences, arguing that the similarities and divergences of approach and intent offer productive means to engage with each (Hayles, 1990:3; also see Summers-Effler, 2007; Toffler, 1984). In this sense the translation is in itself similar to the Latourian model where new forms of relationship are built through hybrid links.

one attributed to the work of Prigogine and Stengers (1984), the other with the mathematics of attractors (see DeLanda, 2002). Where the former recognises the immanent relationship between order and disorder, the latter “emphasizes the hidden order that exists within chaotic systems” (Hayles, 1990:9).

Given the overarching intentions of this interlude I turn specifically to Prigogine and Stengers’ work. This has provided a crucial guide to the development of nonlinear dynamics and turbulence in particular. They place the concept of nonlinear dynamics against the backdrop of Newtonian science’s ideology, typified by a deterministic, mechanical universe, as discussed in *Interlude I*. Against a supposedly fundamental explanation of all matter Prigogine and Stengers posit an alternative that recognises the multiple, the temporal and the complex (Prigogine & Stengers, 1984:2). This stands in contrast to classical science’s disdain for the temporal: these laws were seen as time-independent. However, the belief that reversibility and determinism were the rule may only occasionally be the case, “while irreversibility and randomness are the rules” (Prigogine & Stengers, 1984:8). By identifying such an argument Prigogine and Stengers do not simply promote an arbitrary change, but rather one that reflects the actual constitution of the world, for even at the elementary level “particles would prove to be unstable” (Prigogine & Stengers, 1984:9). This is concerned then with the relationship between stability and instability, in the qualitative values of each. The change in the notion of the timeless, universal quality of even the elemental suggests a situation whereby the transformative becomes the prevailing tendency. Where the manmade may be viewed as deterministic and reversible,

“the natural contains essential elements of randomness and irreversibility. This leads to a new view of matter in which matter is no longer the passive substance described in the mechanistic world view but is associated with spontaneous activity” (Prigogine & Stengers, 1984:9).

Thermodynamics is seen as a forebear of the present, for it introduced the arrow of time

and, so, generated wider intellectual considerations through the emphasis on “increasing complexity” (Prigogine & Stengers, 1984:12). The suggestion appears to be that within thermodynamics equilibrium was still an important factor, so much so that “irreversible processes were looked down on as nuisances, as disturbances, as subjects not worthy of study” (Prigogine & Stengers, 1984:12). Prigogine and Stengers introduce a crucial issue here: that of far-from-equilibrium systems, as compared with the equilibrium emphasised in nineteenth century thermodynamics. This is not the case today, for it is understood that spontaneity produces new forms of structure; chaos may produce order in far-from-equilibrium systems. At the far-from-equilibrium level changes “reflect the interaction of a given system with its surroundings” (Prigogine & Stengers, 1984:12) – this they term dissipative structures, in order to emphasise the entropic, irreversible qualities of change. At the level of equilibrium, repetitive and universal characteristics may indeed be observed, however, far-from-equilibrium systems are localised and specific. Perhaps the most illustrative example that Prigogine and Stengers provide is that of chemical clocks:⁸¹ they argue that for many people the idea of a chemical reaction may be thought of in terms of random molecules colliding. Due to the random nature of such collisions we would expect to see a mixture of red and blue molecules as violet. However, the discovery of chemical clocks proved otherwise: “here the system is all blue, then it abruptly changes its color to red, then again to blue” (Prigogine & Stengers, 1984:148). This is precisely the idea of order emerging from apparent chaos in systems of self-organisation. The notion of the point at which the change occurs—or when molecules “communicate” (Prigogine & Stengers, 1984:148)—is a very useful means to discuss the central argument of this section: that of active change or deviation.

⁸¹ In chemistry a chemical clock is a mixture of chemical compounds that exhibit forms of self-organisation (see Toffler, 1984:xvi).

Active Change:

In order to further position the notion of deviation as active change in relation to turbulence and chaos it is necessary to turn to the work of Serres. In his book *The Birth of Physics* (Serres, 2000) Serres reconsiders the atomist philosophy of Epicurus and particularly the work of Lucretius in his long poem *On the Nature of Things* (Lucretius, 2001). Central to Lucretius, and thus Serres, is the idea of the *clinamen*: a small, unmeasurable deviation in movement that becomes the source of all turbulence and thus of all substance and life (also see Goodman, 2010:105-107). Although the approach taken by Serres is distinct from the overtly scientific, he argues that the supposedly non-scientific writing of Lucretius pre-empted 20th Century physics.⁸² For Lucretius it is the interaction of atoms as they fall through a void that is the wellspring of life. Without the deviation from the fall, “all would fall downward through the unfathomable void like drops of rain; no collisions between primary elements would occur, and no blows would be effected, with the result that nature would never have created anything” (Lucretius, 2001:41). Of central importance to the theory of the *clinamen* is deviation or change. Serres’ analysis stems from his interest in the spontaneous interactions produced by deviation. Rather than atoms requiring some form of external stimuli, it is argued that, “deviation occurs spontaneously, with no cause and to no end” (Webb, 2000:x). The swerve may be said to be an unpredictable fluctuation, or what Serres terms a “fluxion” (Serres, 2000:4), in the orderly fall of atoms in the void. Emanating from the study of fluid mechanics, the concept of the *clinamen* is invested in the supposedly orderly movement of laminar flow, where the movement of atoms are in parallel. But for Serres this is not the case in the natural world, where laminar flow is an illusion. It is a dream or a theoretical *ideal* of order. The image of atoms moving perfectly in parallel and never meeting is a world in

⁸² Serres work as a whole has attempted such a topological conflation of scientific and non-scientific discourses. For example, with the latter he has used the paintings of Turner to discuss the work of the physicist Carnot on heat, arguing that Turner’s work recognised the science of thermodynamics (Serres, 1982b). This ‘two cultures’ approach is exactly that discussed by Prigogine and Stengers (1984).

which nothing exists. Once an atom begins to move at a slight imperceptible angle collisions happen and turbulence occurs. Turbulence appears to reign. However, as Serres goes on to argue, (and as seen with the example of chemical clocks), “the physical theory of turbulence contains a paradox” (2000:27). Although turbulence would seem to suggest that disorder would prevail, the reverse is in fact apparent. The turbulent movement of a fast-flowing river for example may be formed of intricate orders. When the liquid reaches a certain speed or ‘critical point’, “the random flow of a moving liquid gives way to the intricately ordered patterns of turbulence” (DeLanda, 1991:7). Within eddies and flows of turbulent flows lie highly ordered formations. As noted by Brady, it becomes difficult to discern order from disorder.

Via Lucretius, Serres reads turbulence as both *turba* and *turbo* (also see Serres, 1995:100). *Turba* “designates a multitude, a large population, confusion and tumult. It is disorder” (Serres, 2000:28). In contrast, *turbo* refers to a vortex, a “round form in movement like a spinning top, a turning cone or vortical spiral. This is no longer disorder, even if the whirl is of wind, of water or of storms” (Serres, 2000:28). There is a form of meta-stability between the two, a *temporary* balance. Utilising Plato’s example of the child’s spinning top from *The Republic*, Serres interrogates the apparent paradox between stability and instability in the movement of the top. This simple device is at once in movement, teetering turbulently on its axes, but simultaneously perceptibly stable, the pinnacle appearing ordered: like a liquid in motion its momentum provides stability. We have to appreciate, Serres insists, how variation comes from invariance. One becomes the other to the extent where it is impossible to distinguish them: “is it stable?” he asks, “Yes. Is it unstable? Yes, again” (Serres, 2000:28). What does this offer us? Above all it dissolves the supposed universality of equilibrium and order, providing instead a much more complex representation of temporary equilibrium: of fluxions in equilibrium, but equally of the immanent presence of orderliness. DeLanda (1991:8) extrapolates on this

notion of the apparent paradox of immanent order and disorder in his discussion of hurricanes. As turbulent weather phenomena they are an example of order emerging out of chaos. However, the spontaneous emergence of temporary order is also the production of disorder in terms of their potential effects. So, the *internal* operation of the hurricane may be seen as illustrative of spontaneous, emergent order, whereas the *external* consequences (environmental destruction, loss of property, human life etc.) are clearly disorderly. Added to this, temporariness points to the problematic of predictability. Where the model of laminar flow might be defined in relation to predilections of classical science for a governable, perfectly functioning, machine-like system of reversibility, and thus predictability, the onset of turbulence is decidedly unpredictable (see Prigogine and Stengers, 1984:32). Central to these arguments are the specificity of localised change and the relations between order and disorder, or stability and instability. We can use this to begin to think more fully about the concept of localised change, firstly by considering the Serresian notion of deviation as bifurcation, and secondly by addressing the issue of localisation.

In the literature on turbulence theory a critical point of change is that moment when a system undergoes an alteration, one that might be said to embody multiple potentialities. For DeLanda, critical or singular points are opposed to “reified generalities” (DeLanda, 2006:26), as they are points of localised change or systemic redefinition. These events of intensive reconfiguration or moments of bifurcation (DeLanda, 1991:236 n.9) defy the calculative logic of predictability and instead are instances of systemic self-organisation, where it is not possible to pre-establish what will occur. In chaos theory the unpredictable qualities of such critical points of self-organisation are determined by internal reconfiguration. The internal refocusing of the system produces interesting phenomena: as Massumi suggests this critical point is one where there is the “literal co-presence of all of the possible paths the system may take,

their physical inclusion in one another” (Massumi, 2002:109). So we see that the inward-focused system is open to multiple (and often mutually exclusive) potentialities. These potentialities are driven by the interrelatedness of the system itself, with the possible outcome present within the conditions of interrelatedness. But they are not pre-inscribed in the interrelations, rather the interrelations are themselves subject to moments of transformation and bifurcation. Once again, we see they are emergent.

These critical points are illustrated most often in chaos theory through the forking paths of bifurcation. Bifurcations are the critical points of transformation where two potential paths are evident, and the system can be seen to choose “between them on the basis of very small differences in the values of controlling parameter(s) at the point of change” (Byrne, 1998:22). In this scenario the small perturbations in a far-from-equilibrium system can lead to an un-prescribed choice of path. The fluctuations in a system (the precarity between order and disorder) have the potential to destabilise the system as a whole, *or* the system may enter a higher state of order. As Toffler (1984:xv) suggests, the key aspect to this argument is that “it is inherently impossible to determine in advance which direction change will take”. The ability of the system to ‘choose’ a prospective path is governed by randomness. Importantly, the bifurcation is not stable, rather there are “successions of bifurcations [...] where the determinism of characteristic frequencies produces an increasing randomness stemming from the multiplicity of those frequencies” (Prigogine & Stengers, 1984:169). This clearly has analogical implications for social life, as well as for natural systems. Indeed in the final page of their book Prigogine and Stengers note the important diffusion of their work on fluctuation and instability into the social sciences. In particular the concept of bifurcation is addressed for both its positive implications as an instigator of change, and the supposed threat of change as a marker of social instability. Such events of intensive change at moments of bifurcation defy the calculative logic of predictability and instead are instances of systemic self-

organisation (or potential destabilisation in the social realm), where it is not possible to pre-establish what will occur. It is a dynamic possibility of things becoming different. Once turbulence exists then we move from a universality of sameness to a topology of localised singularities. And this topology of possibility negates the efficacy of all-encompassing and unilinear theory:

“If, through the clinamen, the origin of every event or system is always multiple, then every attempt to reduce change to a unilinear process must necessarily fail. There is, therefore, no universal history, no unilinear development and thereby no single frame of reference within which all events may be encompassed” (Webb, 2000:xii-xiii).

This should not to be underestimated. The turbulent emergence of singularities makes any single frame of reference redundant. In doing so it highlights the profound shift from a universalised theory to that of the localised event. This critique of universalised thought is intrinsic to Serres’ work on turbulence. In asking how the local is formed, Serres answers by stating that it is through “a change in sense. Thus by a bifurcation: an angle of rotation on the monotone transference that announces and begins another transference” (Serres, 2000:147). Fluctuation is the production of the local, no longer the assumption of a global figure: instead, the focus lies with the specificities of the localised production of the bifurcation point. This raises the issue of the spatio-temporality of the localised event. For Serres the localised defines space as “scattered, flowering and furnished with local singularities” (2000:188). It is not homogenous or universal. It is unique.

Localised Relationality:

Up to this point we have seen how the materials and debates from complexity theory, chaos theory and the role of turbulence in particular, illustrate a profound shift in the logic of order and disorder. We saw in *Part One* how a singular order developed into multiple modes of ordering, thus de-privileging order as an *a priori* fact. However, with complex turbulence we see how disorder dissolves the assumed ability to *fully* and

permanently control or manage interactions, and at the ontological level it might be said to be the wellspring of life, of active change (Serres, 1995b:13). Perhaps the most prescient idea to emerge from all of these discussions is that of the relational: the relations between atoms, as Serres articulated, being the active production of the world (Serres, 2000:148). In this situation the deviation of the clinamen is a fundamental relation between things. In pursuing this, the discussion of localised relations is intended to situate the later arguments in *Chapters Three* and *Four* on the dissolution of systemic orderings.

My approach to relational configurations of instability is identified, in part, by the Latourian concept of ‘associology’ (Latour, 2007:9). This ‘sociology of associations’ focuses on how associations or relations are made. Whereas the traditional conceptions of the ‘social’ focus on the objects and processes defined by the centrality of the human subject in particular, Latour offers an alternative stance, one where the social is replaced by the *associative*. His substantive argument is this: that the social is made up of heterogeneous relations between the traditionally social and non-social. The analysis of these “relations among forces” (Latour, 1988:7) provides the basis on which to posit the social more fully. The Latourian social is then an assemblage of the human subject, institutional structures, molecular ties, legal statutes, etc., *ad infinitum*. Such assemblages define the social “as a very peculiar movement of re-association and reassembling” (Latour, 2007:7). The social is assembled out of ongoing connections and associations between heterogeneous elements, as well as their disentanglement or re-entanglement.⁸³ Through the relations between elements we can begin to determine the innovative couplings that appear. Such couplings may be described as ‘innovative’ due to the fact

⁸³ The vacillation or indecision between whether disentanglement or re-entanglement is the correct term is intentional. For as Latour’s positioning implies, the assembly of associations is never fixed, so we cannot delineate between whether we are unravelling or further entangling the associations we are studying. (For a similar argument concerning the difference of approach to order and disorder see Brady, 1990:66)

that the couplings themselves are emergent.⁸⁴ Added to this, as Latour suggests, the relations that emerge when traditional social agents interact with non-traditional social agents can “complicate those relations in a terrible way” (Latour, 1988:35). The complications—the transformative, ongoing changes—concern us here.

More recently these debates have featured prominently in work associated with the ‘speculative realist’ turn in philosophy (see Bryant, Srnicek & Harman, 2011), as well as the wider field of process-relational philosophy (Mesle, 2008; Rescher, 1996). Such debates are often heated, with two identifiable camps emerging. One valuing the relations between objects; the other arguing in favour of the substance of individual objects above and beyond their relations with other objects. The former we might associate most readily with the work of Alfred North Whitehead (Whitehead, 1985), the latter with that of Graham Harman (2009; 2010a). Whilst the infighting is rather protracted, it is important to address the critical divergences and convergences of both approaches in order to further articulate my own position. For Harman, the Latourian (and Whiteheadian) perspective is one of relationism, defined as “the view that a thing is defined solely by its effects and alliances rather than by a lonely inner kernel of essence” (Harman, 2009:75). This comes from a realist reading, in that the existence of an object is not determined by the human mind alone i.e., there is a reality outside of human consciousness. Latour’s position re-imposes the question of communication between non-human objects, one that was rejected by Descartes and subsequent Cartesian philosophy. Although we move out of the molecular level of communication we can see the confluence between this notion of communicating objects, and that developed by Prigogine and Stengers. Harman argues that, “the problem of communication is raised anew by Latour as soon as he grants full democratic rights to all actants in the cosmos, denying that any of them

⁸⁴ Latour holds to this notion of emergence in his articulation of the relationship between parts to wholes. He argues that “how something holds together is determined on the field of battle, for no one agrees who should obey and who command, who should be a part and who the whole” (Latour, 1988:164). As emergent capacities the relations between objects are not settled into a hierarchical distribution of part and whole.

contain the others” (Harman, 2009:35). This communicative relation is one of *translation*.⁸⁵ Latour argues that it is difficult to fully assert how various actants are connected, however he does acknowledge that through the relations between objects we must assume that the associations “*make others do things*” (Latour, 2007:107 emphasis in original). By this Latour appears to suggest that the relations between actants effect change. *They are transformed by their interactions*. This is a decisive aspect of my argument. We can see a direct correlation between the swerve of the clinamen and the idea of relationality in Latour’s work. This is also the crucial difference in Latourian metaphysics between *intermediaries* and *mediators*: the former denoting a stable relation, the latter a form of relation that transforms the objects in relation. They “translate, distort, and modify the meaning or the elements they are supposed to carry” (Latour, 2007:39).⁸⁶ As Latour adds, the problematic is how we actually identify whether a relation is an intermediary or mediator. It is clear that if there is difficulty in deciphering the identity then by definition the stability of relations is weak. As such, I argue that relations are mediators, constantly transforming the objects of relation, an argument that will become decisive in the substantive material dealt with in *Chapters Three and Four*. This is confirmed by Harman when he notes that “for Latour, translation is ubiquitous: any relation is a mediation, never some pristine transmission of data across a noiseless vacuum” (Harman, 2009:77).⁸⁷ The vast arrays of Latourian actants are determined by their relations with other actants: *the attachments have the power to effect change in other entities*. So, objects are not delimited by

⁸⁵ As already briefly discussed in *Interlude I* the notion of translation as developed in ANT (see Callon 1986) is descended from Serres’ work more broadly. Indeed, in *The Birth of Physics* Serres argues that the transferences seen with points of bifurcation are moments of translation (2000:147).

⁸⁶ Latour offers a useful articulation of the difference, and one that feeds back into the earlier discussion of linearity and non-linearity. He states that intermediaries are defined by the stability of input and output, whereas mediators cannot account for a correlation between input and output (Latour, 2007:39). As such we might also add that mediators are non-linear relations.

⁸⁷ Harman’s negative rendering of a noiseless vacuum could be said to mirror the Serresian reading of noise as the production of difference (Serres, 1995b; 2007).

their internal qualities but through their capacities to affect and be affected by other entities, an issue we will turn to in the final section of this interlude.

Somewhat in contrast to this position is the question of whether objects are solely constituted by their relations with other objects. Harman, like other ‘subtractive’ approaches (Bryant, 2010), would appear to argue they are not. Ontologically it is suggested that if the world is made up of relations alone then actual objects do not exist. Harman confirms this: “objects for me must be considered apart from all of their relations” (Harman, 2011:295). He does not deny the existence of relations between objects, rather he insists that objects are more than their relations. Part of Harman’s distancing from the overt privileging of relations comes from his concern with ‘change’:

“One of the reasons for my saying so is that if an object could be identified completely with its current relations, then there is no reason that anything would ever change. Every object would be exhausted by its current dealings with all other things” (Harman, 2011:295)

This issue of change is an important one within the internecine debates on objects and their relations. Suffice to say, from our earlier discussion of complexity theory, that my own reading of Harman would counter his argument against change, by suggesting that if a relational object was solely determined by its dealings with its current relations, how then did it manifest itself at that precise moment? What seems to be missing from this approach is temporality, a counterargument also put forward by Ivakhiv (2010). Objects and their relations with both themselves and other objects unfold over time and as such are prone to continual change. The addition of time to the equation enables a more complex rendering of relations, one that adheres to Shaviro’s ‘solution’ to the problem of objects versus relations. In keeping with a process-relational approach Shaviro suggests that we do not accept the irreconcilable “incompatibility” (Shaviro, 2011:283) of objects and relations, rather that we recognise the “contrast” between these approaches and how they may be “organized into a pattern” (Shaviro, 2011:283). By doing so we can begin to

elicit a more complex reading of objects and their relations, a reading that confirms our earlier discussions concerning the complex patterning of order and disorder in turbulence theory (Urry, 2003:26).

Given the earlier discussion of complexity and the order/disorder conjunction the position that I argue in favour of is 'process-relational': a position which recognises the qualities of encounter, and how certain forms of order or indeed disorder can emerge from encounters between objects (see Mesle, 2008). This does not privilege the relations nor does it argue that objects supersede their encounters with other objects. The spatio-temporal aspects of this position are clearly critical, for as Ivakhiv (2010) outlines, if the world is made up of processes and things, relations and objects, then the types of relation, the object-forms, the moment and space of encounter will clearly effect the unfolding nature of relations *and* objects. This returns us to the central problematic of stability raised in the previous two chapters. If the relations between objects are not governable due to the inherently unfolding nature of emergent encounter, what does this imply for the question of spatio-temporal control? In order to develop this I now turn to relational space-time.

Relational Space-Time:

In a paper simply entitled 'Space', Thrift (2006b) delivers some valuable assertions concerning contemporary spatial thinking. One of his most telling arguments is: "there is no one kind of space" (Thrift, 2006b:141). This of course stands in stark contrast to the conceptions of absolute space where space was a preformed given, the inert entity we saw with the discussions in *Interlude I*. That there are many spaces appears to offer us a way of thinking space-time that is multiplicitous, where spaces are *performed* by temporal

processes.⁸⁸ Critically, this suggests that relational space is in constant movement due to the processes that ‘become’ these spaces (also see Graham & Healey, 1999; Jones, 2009; Merriman, 2011). So, the space-time of relations is inherently in a process of transformation.

As Murdoch articulates, “space is made not by (underlying) structures but by diverse (physical, biological, social, cultural) processes; in turn, these processes are made by the *relations established between* entities of various kinds” (Murdoch, 2006:19 my emphasis). Thus demonstrating how the poststructuralist nature of relational space-time divorces itself from the stabilising and gridding tendencies of Structuralism. That these processes are never stable as such provides us with an important distinction between relative and relational space; relative space, as demonstrated in *Interlude I* is concerned with the stability of relations through modes of ordering. The inherent *instability* of relational space-time is testified to by Thrift’s argument that coming into relation is “involuntary” (Thrift, 2006b:139): there are continuous and immanent forces of encounter between various spatial, temporal and material entities. As Whitehead’s work demonstrates (as does the wider field of process-relational philosophy) the relational encounters between entities is always in dynamical process (Mesle, 2008:8). Perhaps this accounts for Thrift’s claim that in relational space “there is no such thing as a boundary” (Thrift, 2006b:140). The proposition here appears to be that, as above, if everything is in relation then there is an ongoing interaction without edges creating a boundary or zone between spaces. As such there is porosity between space-times, an overflowing leakiness (Thrift, 2006b:141). There is constant, active change in the constitution of space-time: they are “constantly sloughing off pieces of themselves, constantly leaving traces – effluent, memories, messages – through moments of good or bad encounter” (Thrift,

⁸⁸ May and Thrift, (2001:5) suggest adopting the compound word TimeSpace to more accurately reflects the continuous, multiple entanglements of the two as opposed to the occasional meetings of time *and* space, as we saw in *Interlude I*. Whilst tempted to employ this here, by continuing to utilise space-time the intention is to locate my argument within the continued widespread use of this phrasing.

2006b:141). The discussions developed in the previous two chapters imply the ongoing attempts to overcome the leakiness of space-time through the creation of boundaries in the form of control measures, and Thrift goes on to add that whilst “every space is in constant motion” (Thrift, 2006b:141), there are also “plenty of attempts to make space static and stable” (Thrift, 2006b:141).

Following Leibniz, Harvey makes the important, instructive distinction between the absolute and relational views of space and time, where in the relational view space and time “are nothing apart from the things ‘in’ them” (Rescher, 1979:84 cited Harvey, 1996:251). These relations produce space-time through the ongoing, contingent relationship between things, as opposed to the absolutist view of space and time as simple containers. Relational space-time ceases to ‘hold’ space down as the neutral container (Doel, 1999:136), in the sense that relationality ‘frees’ space from the shackles of simply acting as a passive container of objects/matter.⁸⁹ The relational ‘constitution’ of space-time is multiplicity, whereby it is fecund. It is full, in the sense of an “excess” according to Murdoch (2006:8), suggesting an ongoing, unconstrained, outpouring, multiplicity to the world. This of course stands in contrast to the contained, constrained mediation of time and space that the absolute suggests: “the existence of this ‘excess’ means that efforts to close down interpretation, to force a single narrative onto multiple perspectives, are now rendered problematic, even illegitimate” (Murdoch, 2006:8).

The concept of relational space-time is Leibnizian in its foundation, for Leibniz argued, in theological terms, that space as contained would suggest that God was contained or bounded by space and time, and as such would reduce ‘His’ power over space and time as the one who constructed the very notion of space and time themselves. However if we move toward a secular configuration of space-time given this critique of containment, Harvey notes how “the relational view of space holds there is no such thing

⁸⁹ Of course, if the ontological constitution of space-time is relational (as I suggest) then to argue that space is ‘freed’ is disingenuous, hence the scare quotes.

as space or time outside of the *processes* that define them” (Harvey, 2006:273 my emphasis). There are potentially multiplicitous processes occurring simultaneously, all of which are continuous and contingent upon the complex array of occurrences: “A wide variety of disparate influences swirling over space in the past, present and future concentrate and congeal at a certain point ... to define the nature of that point” (Harvey, 2006:274). The allusion to spatial and temporal folding that we see with this statement dispels the assumed means to understand space-time through measurement alone, and accounts for more recent appreciation of the multifarious approaches to spatio-temporality such as fantasy, desire and dreams (Harvey, 2006:282), many coalescing around non-representational approaches (Thrift, 2008). This methodological point opens out the present discussion to how these conceptions of space-time themselves commingle or merge. Harvey considers this very issue himself when asking how specific spatio-temporal issues might be addressed. The relational model is the approach most suitable when considering “the political role of collective memories in urban processes” (Harvey, 2006:274) for example, suggesting the overlapping forces of individual subjectivities in producing the urban experience. The ideological tenor of the tensions between the various spatio-temporal formations is articulated by Murdoch when he states that, “while multiple sets of relations may well co-exist, there is likely to be some competition between these relations over the composition of particular spaces and places” (Murdoch, 2006:20).⁹⁰ With this in mind I now turn to an approach that fully addresses the entanglements of competing relations, and also identifies the complex, multilayered configurations of various space-time registers.

⁹⁰ In light of this it is also important to acknowledge Massey’s (2005) warnings of overly fetishising relational space. For although an un-dialectical approach to relational space may at first appear to be an oxymoron, Massey notes the need to situate the relational in terms of the tensile relationship between this and absolutist and relativist workings of space-time (also see Jones, 2009:501).

Assemblage Theory:

From the various debates outlined so far we have seen how the overarching implications for the concept of socio-spatial orderings, as discussed in the previous chapters, are decisive. The dynamical processes of chaos theory, the figuring of emergence in complexity theory, the active entanglements of order/disorder in terms of turbulence, and the multiplicity of relational space-time: all point to a profound shift in the logic of space-time relations. Whilst the various approaches share common features and lines of argument there are clearly divergent tendencies, not least the analogical application of the physical sciences to the social. More recently, the partial consolidation of these approaches (and others) has become apparent in the work gathered under the moniker ‘assemblage theory’. Like complexity theory in particular, assemblage theory provides a conceptual and analytical approach to social complexity that emphasises the co-functioning of stability and instability. Given this, it is clearly understandable why assemblages have become prominent tools through which to promote the ‘event’ of co-functioning actors in distributed space-time networks. We see such approaches, for example, in human geography (Allen, 2011; Anderson & McFarlane, 2011; Braun, 2006; Dewsbury, 2011; Legg, 2011; Robbins & Marks, 2010; Swanton, 2009; 2010) and political philosophy (Bennett, 2010; Braun and Whatmore, 2010; Connolly, 2011). Perhaps the thread connecting these is the one identified by Robbins & Marks (2010:180): they suggest that assemblages reside in a “world of interacting objects, bodies, and actors, rather than a single conceptual element, location, or thing”.⁹¹ This clearly embodies many of the previous debates on the relational interactions of objects effecting change.

The intellectual legacy of this approach is situated with the writing of Deleuze and Guattari (1986; 1988; also see Buchanan, 2000:118-40). Their work on assemblages is

⁹¹ For Anderson and MacFarlane (2011:124) assemblages offer an openness of encounter between the multiple materialities of the world. In this sense there is perhaps greater scope in the application of assemblage theory to the complexities of the social-natural entanglements, than with turbulence.

clearly aligned to their overarching interest in intensities, so obviously demonstrated by the use of the rhizome as a means to overcome the fixity of traditional arboreal narrative structures of culmination and end. Instead they are driven by the *connective* impulse offered by flows across the semiotic, material and social (Deleuze & Guattari, 1988:22-23). In rejecting the denouement of a confined narrative (or single location) they are emphasising, especially in terms of the arguments outlined above, the *openness* of encounter that connections foster. At the outset of *A Thousand Plateaus* the vacillation between differing forces, be they order/disorder, or acceleration/slowness, is noted:

“One side of a machinic assemblage faces the strata, which doubtless make it a kind of organism, or signifying totality, or determination attributable to a subject; it also has a side facing a body without organs, which is continually dismantling the organism, causing signifying particles or pure intensities to pass or circulate, and attributing to itself subjects that it leaves with nothing more than a name as the trace of an intensity” (Deleuze & Guattari, 1988:4).

With hindsight it is this continual interplay between stratification and de-stratification that this interlude has attempted to investigate up to this point. Assemblages demonstrate how various forces continually construct and deconstruct each other, offering at one moment a form of stability, but simultaneously its collapse. Whilst the importance of Deleuze and Guattari’s development of assemblages should not be underplayed, it is the work of a latter-day Deleuzian that this section will end with: Manuel DeLanda. He has most thoroughly developed the theory of assemblages in his book *A New Philosophy of Society: Assemblage Theory and Social Complexity* (DeLanda, 2006). As discussed earlier with regard to Latour, the premise of DeLanda’s ontology is realist, but DeLanda’s approach is above all anti-essentialist. That is, the world is constituted by processes, not through the essence of things. Here then we are witness to his focus on emergent processes of relation as opposed to the inherent properties of things. As such we can see that the legacy of complexity theory is also present in DeLanda’s rendering of assemblages (hence it nestles in the subtitle of the book). In order to fully articulate an assemblage perhaps

the best place to start is with its antithetical other. For DeLanda an assemblage is not a totality; that is, we cannot reduce the wholeness of a system to its component parts. For example, a model aeroplane cannot simply be defined through the disassembled pieces: rather there is the contingency of process whereby the ‘plane-ness’ is never fully established (Wise, 2005:77). As with the emergent processes of complexity theory “every sort of entity is an assemblage. This entails that no object is a seamless whole that fully absorbs its components” (Harman, 2010b:172). There is an endless layering of different assemblages, with no fixed totality. As emergent, the relations between things do not simply add up to a whole. If we take the previous discussions in *Chapter One* on containerisation: viewing it as a stable, systematised totality we would assume that the system is bounded and the relations between the component parts of the system governable by their presence in the system, i.e., the container is transferrable from ship to shore via the portside gantry cranes. In an assemblage, containerisation is part of multi-layered series of endless assemblages, so in the context of container movements we could situate a further assemblage of destabilising entities, that of weather systems, breakdowns in the handling equipment, or vessel refurbishments, as we shall see in the next chapter. Assemblage theory, then, strips away systemic totalities, and in doing so uncovers “an endless chain of interlinked forms, each form never fully actualized in its surroundings” (Harman, 2010b:179).

DeLanda’s assemblage project is a rather daunting one, in that it attempts to overturn the very notion of totalising thought (hence its apparently grand title). In admitting the scope of his endeavours my intention is to suggest that only certain aspects can be outlined here. Given the discussions throughout this interlude, my reading of DeLanda focuses on the question of relationality. By doing so I am in fact adhering to DeLanda’s own *modus operandi*, for as Harman points out, DeLanda’s key thesis is that of ‘capacities’: “they do all the relational work for DeLanda” (Harman, 2008:372). Let us

turn to his concept of capacities, and the interlinked argument on ‘relations of exteriority’. An object’s *capacities* are distinguished from its *properties*. Central to this is—once more—the issue of relationality. Are the inherent properties of an object more defining of that object than the object’s relations with other objects? For DeLanda, like Whitehead and other process-relational thinkers, the answer is determined by both the properties of an object, aligned with its relations or capacities to interact with other objects (DeLanda, 2006:10). Crucially, the properties of a thing are fixed, that is they are preconfigured by the internality of the object. Capacities by contrast are *open*: “there is no way to tell in advance in what way a given entity may affect or be affected by innumerable other entities” (DeLanda, 2006:10). The importance of this for my argument should not be underestimated: DeLanda is making the case that the relational interactions of objects with others cannot be permanently stabilised. For our previous discussions on the attempted stabilisation of distributive space the relational capacities of an object overturn the purported stability of interconnection. Capacities are determined by external relations with other objects: what DeLanda terms “relations of exteriority” (DeLanda, 2006:10). As such, these emergent forms of externality differ from the internal properties of an object, its so-called ‘relations of interiority’. The relations of interiority clearly allude to relationality, but in this case the relations are said to “constitute a seamless totality” (DeLanda, 2006:9). We might argue that relations of interiority are closest to the previous discussions of systemic stability through the partitioning of a system, as with ‘contained continuity’. Here then the internal relations are not simply bounded by the seemingly small-scale dimensions of an ‘object’, instead the object in question may well be a systemic object—that of distributive space itself. The interiority of relations is constituted by a wholeness which “possess[es] inextricable unity in which there is a strict reciprocal determination between parts” (DeLanda, 2006:9). This is strikingly close to the spatio-temporal constitution of the logistically driven version of relative distributive space. But

as we have seen, whilst materially the unity of a system may be secured through specific features previously outlined, the ontological stability of such a position is problematised by the open capacities of the relations of exteriority, an argument which will be pursued shortly in *Chapters Three and Four*.

However, DeLanda's notion of exteriority, in similar terms to process-relational approaches, argues that capacities are not simply destabilising. For whilst the closed nature of the interiority of properties may suggest an inflexibility, the openness of external relations is configured by both stabilisation *and* destabilisation.⁹² So, an object's capacities may help to stabilise an assemblage, or alternatively to destabilise it. This is dependent on the assemblage itself, but also on the contextual, contingent nature of exteriority. DeLanda argues that,

“one and the same assemblage can have components working to stabilize its identity as well as components forcing it to change or even transforming it into a different assemblage. In fact, one and the same component may participate in both processes [of stabilisation and destabilisation] by exercising different sets of capacities” (DeLanda, 2006:12).

In this case we can see the openness of capacities. Not allied to ordering or disordering alone, the localised circumstances of their becoming make the outcome unpredictable, if not wholly random. Further to this, the capacity of an object to action different stabilising or destabilising tendencies points to the autonomy of the object from specific assemblages. In effect this stands in contradistinction from unified, systemic wholes where an object's identity is formed by its position in the whole. In an assemblage “parts that are self-subsistent and articulated by relations of exteriority [...] may be detached and made a component of another assemblage” (DeLanda, 2006:18). The spatio-temporal implications of this are extremely interesting. Although DeLanda does not argue this directly, the inference of his argument is that a component of one assemblage

⁹² For a similar argument see Law (2004:25). In his discussion of ‘object-constancy’ Law argues that an object is produced by a reconfiguration of relations, however these are not limitless.

may simultaneously be part of another assemblage without perceivably altering its properties or spatio-temporal location. As a clue to the arguments shortly to be outlined in *Chapter Four*, we could take the obvious example of an ISO shipping container. To address it from the perspective of its relations of interiority, its operation is determined by its place within a perceived systemic whole—that of intermodal containerised transport. But if we attend to it from a relation of exteriority the capacities of the object are open. It is perceivably part of one assemblage, that of container transport, but it may simultaneously be part of another assemblage, that of tobacco smuggling for example. The self-same object, according to DeLanda’s thesis, could be detached from one assemblage and ‘made a component of another assemblage’. The key factor in my own argument—to be fully outlined shortly—is that the component remains in one assemblage (container transport), whilst *imperceptibly* acting in another (that of tobacco smuggling).

Conclusions:

To close this interlude, I return to Figure 2 in relation to Latour’s (1987b) discussion of Michel Serres’ broader oeuvre. To recall the discussion in *Interlude I*: this image is of an ocean, an ocean with small islands of disorder in an ocean of order. In this scenario “order is the rule; disorder the exception” (Latour, 1987b:94). However, if we look at Figure 26 we can see that this has been switched, so that the ocean is one of disorder, populated by archipelagos of order. Such a reversal is a useful example of how the seemingly simplistic reversal of viewpoint disarms established dogma. As suggested at the outset of this interlude, and also in the discussions outlined in *Interlude I*, traditional conceptions of the social were populated by modes of ordering, enforced as Latour offers, by “strong divides” (Latour, 1987b:94). We might think of these divides as the concrete manifestations of securitisation, or the standardising processes of

containerisation. The standpoint taken in this interlude follows Serres' lead: by reversing the image of disorder as the exception, and arguing that order may emerge from disorder.

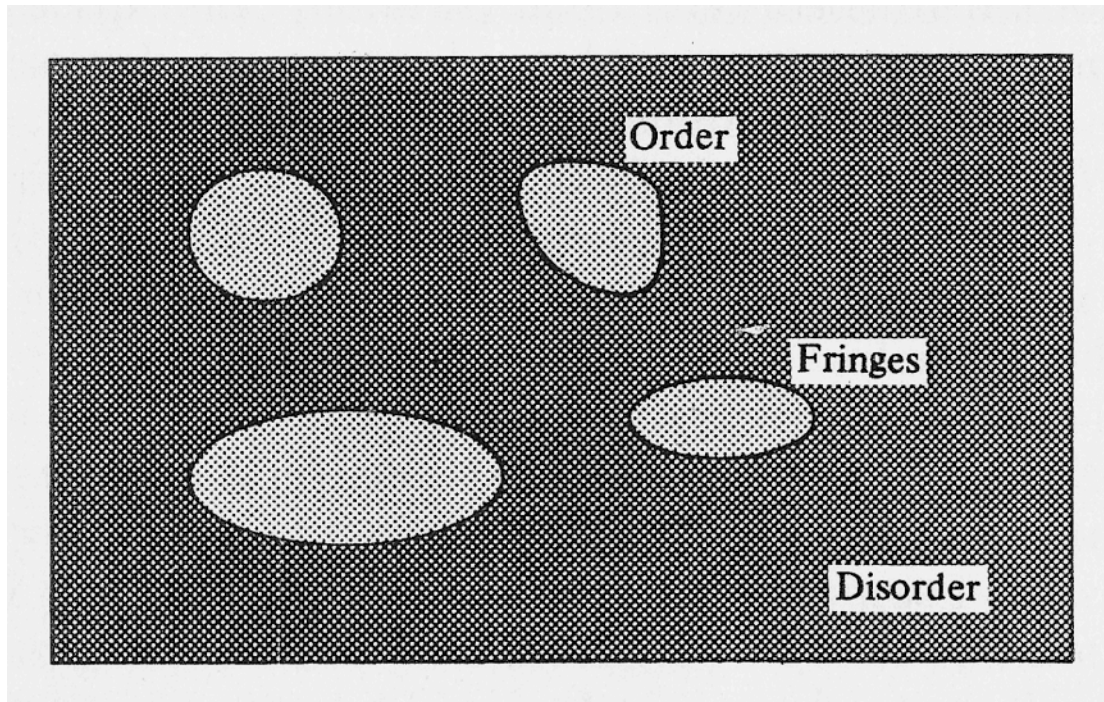


Figure 26: Islands of order in a sea of disorder (with 'fringes') (Source: Latour, 1987:95)

As a result we can see an ontological shift toward an appreciation of disorder being the rule: “fluctuations, noise, randomness, chaos is what counts” (Latour, 1987b:94). Equally important in Latour's rendering of Serres' reversal is the presence of “fringes” between disorder and order. Rather than a divide, a fringe is suggestive of the confluence and entanglement between disorder and order, as opposed to their separation. The intention of Serres' reversal, and my own in this interlude, is to argue that disorder and order are coexistent (Michael, 2000:29). They have the potential to produce new, unexpected conjunctions and conjoinings: or as Webb terms them, “unexpected kinships” (Webb, 2000:viii).

The main arguments raised here are intended to foster appreciation of such unexpected kinships; relational ties emanating from the geographies of interconnection, but ones that do not adhere to established modes of ordering or control. Instead, the

intention has been to insist that the theoretical legacies of chaos theory, turbulence, complexity, and more recently assemblage theory, offer valuable and constructive tools to critique the rendering of socio-spatial relations outlined in *Part One*. The ‘generosity’ of these theoretical models means that a binary switch is impossible. Given the arguments outlined here it is evident that we have to be cognisant that disorder is not simply the opposite of order, but rather that they are immanent to each other. The legacy of chaos theory in particular as outlined throughout this interlude, teaches us that order can emerge from seemingly chaotic processes. But equally, as Prigogine and Stengers’ work so aptly demonstrates, the temporality of processual change denudes the assumed stability of mechanistic classical thought. The onset of turbulence is unpredictable, and the critical points of change exemplified by the concept of bifurcation again highlight the importance of the local and the unique, as opposed to the universal. At such critical points of change, the outcome is unpredictable, possibly a higher level of order, or further turbulence. Above all, change is constant. Given the title of this interlude, the broader implications of such arguments lie with the issue of the relational. I have attempted to argue that a foregrounding of the process-relational approach emphasises the *transformative* nature of interactions between objects. Such transformative occurrence is indeed evident in the discussions surrounding space-time, where spatio-temporal relations are ‘involuntary’. The arguments to be outlined in the following two chapters deal with this.

Finally, the potential of assemblage theory to problematise and complexify the apparent stability of systemic modes of orderings should not be underestimated. It facilitates a more nuanced appreciation of the relational constitution of distributive space, raising in particular the immanent presence of instability. But the reach of assemblage theory as an analytical tool should not be accepted without recognition that it is inevitably

playing ‘catch-up’ with the complexity that it might be said to embody.⁹³ Given this, and the other possible modes of address outlined here, the key approach (and one a little more modest than the overarching ‘solutions’ of assemblage theory) to be taken from this section is that of *relational capacities*. By this I suggest that we should recognise the capacity of relations to exhibit exteriority. Such a notion of exteriority offers the means to address an object’s, or an entire system’s, capacity to exceed its assumed function. These arguments will be fully outlined in due course, but for the moment I suggest that the relations of exteriority connote the way in which assemblages are interlinked by various other assemblages, thus creating unpredictable, emergent occurrences.

⁹³ In this sense Law’s (1994:31) comments on the act of writing (or theorising more broadly) as a mode of ordering are prescient.

Chapter Three:

Hybrid Conjoinings: 'Accidental' Interconnections on a Devon Beach

Introduction:

“Every event, of whatever kind, carries conditions of anomaly” (Massumi, 2002:223)

Bumper packs of nappies sit next to dog-food; tins of spaghetti nestle alongside packs of expensive French perfume. An overturned car lies damaged inside a shipping container. BMW motorcycles are manoeuvred out of containers under cover of darkness, their potential new owners gleefully straddling them as their friends push them along on makeshift skid-boards to prevent them sinking into the shingle. Others stand proudly next to their expensive ‘prizes’ (see Figures 27 & 28). The scene resembles a veritable marketplace, with people directing others to the specific location of goods strewn across the beach (Morris, 2007:3). Shortly to be posted around the beach are notices from the Receiver of Wreck informing people to return goods scavenged from the beach to the Donkey Sanctuary in Sidmouth, Devon. This incident, the beaching of the container ship, the *MSC Napoli*, off the Devon coast in January 2007, offers a veritable snapshot of distributive space. The grounding also represents the entanglement of order and disorder: for some (those beachcombing), it is a welcome eruption of disorder; for others (the vessels operators), it is a decidedly unwelcome episode that will lead to increased insurance premiums and the cost of the clean-up operations; for the marine ecosystem it is an attack on their habitat; for the Receiver of Wreck the recalibration of the system is a necessary aspect of their job, just as it will be for the Marine Accident Investigation Branch (MAIB), charged with investigating the cause of the grounding. These various actors, the objects strewn on the beach, the people charged with recovering the goods, those investigating the grounding itself, amongst numerous others, are all testimony to the shifting registers of order and disorder, neither of which is permanently stable, always locked into a disjunctive interplay.



Figure 27: Branscombe Beach, Devon (Source: courtesy of Maritime & Coastguard Agency)



Figure 28: Branscombe Beach, Devon (Source: courtesy of Maritime & Coastguard Agency)

Massumi's quote above testifies to the position that this chapter argues in favour of: the immanent presence of the anomaly or 'accident' in all forms of social relations. Within the geographies of distributive space these anomalies can manifest themselves in a variety of guises, be they the tumult of the ocean (Langewiesche, 2004; Svendsen, 2009), the sway of a container as it is lowered onto an awaiting truck, or more pointedly the complex assemblage of relational capacities that produce unintended outcomes, such as the beaching of the *MSC Napoli*. The logic of standardisation as we have seen in *Chapter One* attempts to create a series of 'good' interactions between multifarious elements within a tightly coupled logic. However, as this chapter will assert, such attempts fall prey to what I term moments of *hybrid conjoining*: these are intended to reflect the notion of heterogeneous couplings where unplanned interactions occur. Similarly to Latour's diagrammatic rendering of hybridity (Figure 3), the conjoining of discordant actors breaches the systemic divides discussed in *Part One*. It also speaks to the focus in the previous *Interlude* on the unexpected kinships produced at critical points of bifurcation. To illustrate this, in *Ordinary Affects* Kathleen Stewart describes an everyday example of such conjoining, where a crash between a motorcycle and a deer on a deserted highway creates a tangled set of social interactions when the injured motorcyclists enter a roadside café post-accident (Stewart, 2007:11-12). The accident is a catalyst of sorts; it spawns a web of relations that would not have emerged had it never occurred. The accident is responsible for the conjoining of various social relations, including the 'coupling' of technology and animal form, and an aleatory narrative where a planned journey is thwarted. More importantly for the present argument, it was the unexpected coming-together of the motorcycle and the deer that produced (for that instant) other ways of looking at the world. It was about chance and change.

There is perhaps something troubling about viewing an accident in this manner, an approach that perhaps nullifies the utter carnage that an accident or a disaster can cause

(Massumi, 2011a; 2011b; Protevi, 2009). In the case of the Branscombe beaching there were the effects on the marine ecosystem (302 tonnes of oil was lost from the ship (Mercer, 2009:3)); incidents of criminality; disruption to the day-to-day life of the local area; the economic costs to the shipping line; as well as resultant increases in insurance premiums to the shipping industry as a whole, and potential implications to consumers. Whilst aware of the potential pitfalls of such an approach the aim of this chapter is to reconsider how the accident is viewed as the *generative conjoining of differential elements that exceed our ability to pre-empt or predict such unexpected kinships*. If we take the accident as a complex set of interconnections (Law, 2004:94) then it is possible to posit it as an assemblage of relations that de-emphasises a one-dimensional façade of commodity distribution. In this guise the accident offers alternative ways of conceiving the heterogeneity of mobility, namely as a productive process of *constant* failure and recalibration. To suggest this is to acknowledge the presence of continuous, ongoing tensions in the armature of mobility as opposed to the optimised efficiency of logistical rhetoric. For the condition of ‘error’ in a broader sense can be deemed productive. In *Interlude I* this was discussed in terms of David Pye’s ‘workmanship of risk’ whereby the potential offered by variability leads to aesthetic advancement. Error can also result in systemic innovations (Graham & Thrift, 2007:5). Of course, heeding the warnings of Roberts (2011:16) we have to acknowledge that this is about qualitative difference, and scale. As with Pye’s argument, one might think of “virtuous error” (Roberts, 2011:16) as a means of creating new forms of knowledge. However, an error of judgement in the case of a surgical operation can have catastrophic consequences. Above all then, “there are only contingent errors, matched by the contingent conditions of their production, assimilation, eradication and transformation” (Roberts, 2011:16). Whilst Roberts goes onto identify different categories of error (philosophical, scientific, psychoanalytical, political, artistic), my own approach to the question of the accident primarily focuses on

the issue of systemic failure, but also considers the philosophical ground. Overall, these various conceptions of the accident should be set against the widely accepted notion that the accident is “an unexpected event” (Hamilton, 2007:1). Such a statement provides us with the productive—if at this stage simplistic—interpretation of the accident/non-accident distinction as one of intended purpose and its failure to be completed. It is this relationship between the accident and its Other that I am also interested in.

One of the overriding premises of this chapter is to ascertain the relationship between distributive space, turbulent uncertainties, and the concerted attempts to order uncertainties through prediction and pre-emption. Where the issue of apprehension is central to Blanchot’s (1995) positing of the disaster, it is also critical to this chapter. For him the dissection of the unknown potential of the disaster concerns the notion of *timing and surfacing*: when and where does the disaster occur; what conditions produce ruptures of intense magnitude?⁹⁴ This is also the concern of the more pragmatic function of risk and disaster management: to predict the instant of occurrence and to protect against such ruptures. There the similarities end. Whilst we will consider this in relation to the function of the two key *Napoli* accident reports (Marine Accident Investigation Branch, 2008; Mercer, 2009), Blanchot is more interested in the conditions that permeate the disaster as elusive. Such a situation is illustrated most profoundly by his confounding argument that “there is no reaching the disaster” (Blanchot, 1995:1). By this he suggests that disaster is immanent to the process of thought itself. I attempt, in part, to take Blanchot at his word when he states that it is difficult to ascertain whether the reason the accident remains so elusive is due to the closeness, or distance of the disaster and the purported idea of the ‘normal’.

⁹⁴ It is important to add that Blanchot’s interest in the disaster is at the level of writing. The rupture that I speak of is for him primarily the potential of language to counter the tendency to explicate the rational. Whilst the position of writing is an exemplar, my own interests with the question of rupture are inherently spatial in the wider sense of a geographical ‘language’ of space.

By focussing on the notion of discontinuity and interruption as part of an accident-assemblage the intention is to utilise the accident in order to raise a number of critical issues, including the precariousness of systemic modes of ordering seen in *Part One* of the thesis. So where the social milieu pictured by logistics for example is premised on forms of stabilisation, I use the first section of this chapter to speak of an inherent friction in the form of messiness, instability, and uncertainty (Tsing, 2004:4; Turnbull, 2000). Also in this section I argue that the eruptions seen in this incident are examples of hybrid conjoinings, where a range of forces coalesced at this specific moment in time leading to the beaching of the *Napoli*. This is framed around the discussions in *Interlude II* on the unpredictable nature of the complex relationality of the distributive space assemblage. Further to this, it is evident that the nature of such unexpected kinships were partly the result of systemic and structural inefficiencies in the maritime freight industry itself. So the debates in *Part One* on systemic stability through universal standards become problematised.

In the following section I turn to the various conceptual elicitations of the accident, noting above all its relationship to uncertainty, whilst also framing it around debates on risk. It is also argued that a productive means of defining the logic of the accident as an unexpected series of outcomes is to situate it within a wider philosophical discourse, notably that of Aristotle's distinction between the accidental and substantial. Although aware of conflating different discourses on the notion of the accident, the intention is to locate the overarching positioning of the accident as abnormal. However, to simply fetishise the accident as a form of uncertainty or disorder would be misplaced, especially in light of the constant attempts to 'locate' the accident in terms of providing practical solutions to pre-empt future accidents. The next section deals with a similar set of debates raised in *Part One*: how to stabilise the effects of the accident? Initially I do so by looking to the two main reports on the *Napoli* beaching. The report published by the

Marine Accident Investigation Branch (2008) is employed in order to consider both the function of the report itself, as well as the wider notion of pre-emption and prediction within risk and accident management. The other report of the main public inquiry (Mercer, 2009) is also discussed in light of its different approach to the conceptualisation of the accident, notably in terms of its focus on preparedness, as opposed to pre-emption. Although these differ in this manner, both cleave to modes of (re)ordering. Finally, the reports are framed around the wider literature on the hazards research, particularly the work of Hewitt (1983) on ‘un-ness’ as a form of conceptual and pragmatic division between the normal and abnormal.

Although Hewitt’s work dates from 1983 he presciently identified the problem of a semantic division between the accident and its Other. I develop this argument in the next section entitled ‘The Ever-Presence of the Accident’, where the immanent bond between the accident and stable forms of operation is read through Virilio’s (2007) work on the standardised accident. Of course, this is developed in order to fold back into the debates on standardisation in *Chapter One*. In doing so the intention is to highlight the *duplication* of error through complex systems of repetition, as well as the inherent instability of standardisation. Briefly situating this in relation to John Locke’s (1975) critique of the Aristotelean accidental, I pursue Locke’s thesis that the accidental can be the ‘site of new knowledge’. This line of reasoning alludes to recent work on the productive nature of error as a form of knowledge creation (Graham & Thrift, 2007). This leads to a significant argument of this chapter: that the *Napoli* accident productively *reveals* the infrastructural power of distributive space, albeit with the resultant effects of the accident. Even with these environmental, social and economic effects, it is also evident that this accident has proven useful in identifying structural and systemic weaknesses in the maritime freight industry. The productive nature of the accident or uncertainty more broadly is then set in the context of certain approaches to contemporary risk

management, where the “new politics of uncertainty” (Power, 2004:62; also see Power, 2007) appears to suggest a shift in the envisioning of uncertainty as that which must be controlled. I ultimately refute this.

Hybrid Conjoinings: The Beaching of the MSC Napoli:

“Their [infrastructures] very connectedness poses dangers in terms of the speed and ferocity with which perturbations within them can cascade into major disasters. It does not take a suicidal terrorist to do this. We have socio-technical systems that can quite happily do it unintentionally on their own. Their own dynamics may engender catastrophic events” (Dillon, 2005:3)

As Michael Dillon implies, when mobilities and interconnections of all kinds multiply, becoming more complex and more central to the world we inhabit, so, by implication, do the entanglements of order and disorder, manifested by the complexity of interactions between various actors in the mobilities assemblage (also see Little, 2002). Similarly Anna Tsing argues persuasively about the contingent messiness of interactions at a global level, noting “the awkward, unequal, unstable, and creative qualities of interconnection” (Tsing, 2004:4). Although specifically concerned with forms of cultural translation, Tsing’s comments on friction as a counter to the perceived smoothness of globalisation provide a welcome antidote to the logic of continuity. Part of my argument is that we need to attend to such unwieldiness in order to account for “greater recognition of the agential powers of natural and artifactual things” (Bennett, 2004:349). These powers are aleatory occurrences that produce distinct combinations of actants, be they human or nonhuman. Bennett’s discussion of the idea of unintended interconnection revolves around a scenario where she describes the chance coming-together of varying elements that make up a specific assemblage of everyday life: in this case the author sitting outside a café. She recounts seeing a glove lying on the floor alongside a dead rat, pollen pods, a plastic bottle cap and stick of wood. Instead of seeing these items in separation such mundane artefacts can be drawn together she argues, to form a temporary assemblage of “glove-pod-rat-cap-stick” (Bennett, 2004:350), a formation that is constantly shifting.⁹⁵ Likewise

⁹⁵ In a similar vein Michael (2000:117-139) develops the notion of co(a)gency, so that disparate actants are conjoined as an assemblage. For example, in the context of mundane practices of everyday activities such as walking a dog, he develops the neologism of the ‘Hudogledog’: that is, a Hu(man) + Dogle(ad) + Dog. It is important to introduce a qualification: whilst Michael emphasises a hybrid between heterogeneous elements, this lacks the affective intensity of the accident as a calamitous event.

I wish to argue that one means of thinking the accident is through the admittedly abstract lens of recognising it as an assemblage of hybrid conjoinings. In the case of the *MSC Napoli* accident these were the unexpected kinships of weather, speed, human error, institutional corruption and greed, as well as material failure.

On 18th January 2007 the *MSC Napoli* was damaged in a storm off the south coast of England (also see Cook & Tolia-Kelly, 2010). Its 26 crew took to the lifeboat and were rescued. The ship, once one of the largest container ships in the world with a capacity to hold over 4000 containers (Marine Accident Investigation Branch, 2008:3), was towed towards Lyme Bay and the port of Portland. Fearing the ship would break up, on 20th January the ship was beached in the relatively sheltered waters of Branscombe Bay, off the coast of Devon. There were 2318 containers on board, 700 of which were stowed on deck and just over 110 of these were washed overboard. Fifty containers and their contents washed up on beaches along England's South coast over the next few days (Mercer, 2009:13).⁹⁶ Most were on Branscombe Beach. Between the 21st and 23rd January large crowds gathered on the beach and began to salvage the contents of the smashed containers: the nappies, dog-food, and motorcycles described at the outset. Whilst the contents of the open containers was classified as salvageable goods, and thus governed by the 28 day rule whereby salvors have this time to report their finds to the Receiver of Wreck, the beach itself was deemed a 'crime scene' after sealed containers were broken into. During the week of these events the media was full of wide-eyed reports that fixed on the kinds of things being scavenged, resulting in, what the main inquiry termed a "mendacious, national, and ultimately frightening interest in the prospect of illegal profit"

⁹⁶ The main *Napoli* inquiry (Mercer, 2009:22) noted that one month after the beaching there were a total of 111 containers lost overboard, with 58 on the beach at Branscombe, six washed ashore to the east of Branscombe, nine on the seabed and a further 38 unaccounted for. As late as December 2008 the report states that "industrial mop-heads like large sea urchins littered the beach" and that "cargo will probably continue to be located ashore and on the sea bed of Lyme Bay for some years" (Mercer 2009:25).

(Mercer, 2009:13). By the 24th January the beach was cordoned-off by the police in an attempt to reinstate order.

According to the investigation carried out by the Marine Accident Investigation Branch (2008) there were a number of contributing factors that led to the accident. Overall, the ship “encountered heavy seas, causing [it] to pitch heavily” (Marine Accident Investigation Branch, 2008:1), and due to a material failure in the engine room the hull suffered a catastrophic failure, causing a large vertical fracture on both sides of the ship, leading to its abandonment. The first might be termed a form of ‘natural agency’ that lies outside of systemic control; the second, might be called (after Bennett 2004) ‘recalcitrant materiality’ in terms of a nonhuman contributory factor. However, the report states that no one factor was deemed responsible, highlighting the contingent interactions of the system. Whilst the ten central contributing factors are listed in separation (Marine Accident Investigation Branch, 2008:45) the revealing aspect of the report concerns the *distributed* nature of these factors. Like Bennett’s analysis of the North American electricity blackout of 2003 (Bennett, 2010:20-38) the lead-up to the beaching of the *Napoli* was a result of a series of critical failures, including:

- The lack of safety margins in the design of the ship’s structure, which can affect the impact of whipping effect along with bending moment of the hull;
- The speed of the vessel during the incident;
- The design of the ship itself, such as the placement of the engine room;
- As well as “discrepancies in the declared weight of the containers” (Marine Accident Investigation Branch, 2008:45).

As we saw in *Interlude II* these are telling reminders of how even the most stringent means to protect the commodity distribution system from disruption cannot account for the immanent presence of turbulence within any system. But there is an important adjunct to this aspect of the argument beyond the fact that there was a deviation or swerve in the smooth, laminar flow of commodity mobility. What turbulence theory in particular enables us to garner from this is not simply that such occurrences act independently of

one another, rather that they *spontaneously collided at critical points of bifurcation*: that is, they conjoined in a hybrid manner that exhibit capacities or relations of exteriority.⁹⁷ The heavy pitch resulting from heavy seas was a contributory factor in the hull failure, however the singularity of this instant depended on the spatio-temporal ‘collision’ with the other contributory factors, including the speed of the vessel and weaknesses in the ship design. To follow DeLanda (1991:236 n.9), this was a bifurcation, a spontaneous mutation of the system resulting from the immanent union of order and disorder. All of the contributory factors are testament to disordering presences that manifest themselves when the localised moments of hybrid conjoining occur. This is a powerful reminder of how even the most stringent means to protect the commodity distribution system from disruption cannot fully pre-empt the hybrid conjoinings of the various parts of the system.

Both the MAIB report, and the later full-scale public inquiry (Mercer, 2009), note that a contributory factor was the discrepancy between the weights declared by the packer or shipper of containers and their *actual* weight, thus leading to the potential overloading of the vessel (Mercer, 2009:33).⁹⁸ Although the MAIB report acknowledges that it was difficult to ascertain the total weight of the containers onboard at the time of the accident due to water logging (2008:28-29), it does reveal the extent of undeclared container weight. Some 20% of the containers stowed on deck “were more than 3 tonnes different from their declared weights” (Marine Accident Investigation Branch, 2008:29). As a result the loading software could not accurately allocate a correct or stable loading position for individual containers. The MAIB report (2008:29) also notes that 7% of the on-deck containers were incorrectly positioned when compared with the planned loading

⁹⁷ In a similar line of reasoning Massumi argues that the scale of an accident “depends on the cofactors with which it enters into complex resonance, within and between systems” (Massumi, 2011a:26).

⁹⁸ The MAIB report, whilst noting the discrepancies in declared container weights, does state that this would not have *directly* led to the fracture of the hull. However, it does claim that this will have reduced the safety margins in place (Marine Accident Investigation Branch, 2008:45).

positions, leading to potential instability in the ship when at sail. Further to this, the MAIB report reveals systemic weaknesses in the purported ‘legibility’ of the container freight industry as a whole. It points out that,

“Container shipping is the only sector of the [freight] industry in which the weight of a cargo is not known. If the stresses acting on container ships are to be accurately controlled, it is essential that containers are weighed before embarkation” (Marine Accident Investigation Branch, 2008:42).

The practices of not weighing, or under-declaring the weight of, containers is seen as endemic to the container shipping industry, for reasons of lessening import duties (Marine Accident Investigation Branch, 2008:42; also see Nordstrom, 2007:119-120) and overloading ships to improve economies of scale.⁹⁹ This latter point is further proven when the issue of speed is contemplated. Speed is considered central to the distributive space of capitalism, as identified by the original research into the potential benefits of containerisation discussed in *Chapter One* (McKinsey & Co., 1966). However, speed was a key contributory aspect of the *MSC Napoli’s* hull failure. If the speed of the vessel had been reduced during its engagement with the heavy seas the potential failure of the hull would have been reduced. Part of the reason for its sustained speed was due to the vessel being six days behind her schedule when she sailed for Sines in Portugal. The *Napoli* followed a regular sailing schedule between South Africa and Northwest Europe, with a rotation of “Cape Town – Port Elizabeth – Durban – Port Elizabeth – Cape Town – Las Palmas – Felixstowe – Hamburg – Antwerp – Le Havre – Sines – Las Palmas” (Marine Accident Investigation Branch, 2008:4). When the vessel left Cape Town on 29 December 2006 it was four days behind schedule, so the vessel charterer decided to cancel the calls at Hamburg and Le Havre (shipping containers overland from Antwerp instead). The schedule was

⁹⁹ In a further aspect identified by the MAIB report: although not deemed central to the hull failure, fillet welds in the vicinity of the crack had previously been repaired (Marine Accident Investigation Branch, 2008:23). However, due in part to the different histories of the ship’s register, it was not possible to trace the history of repair. This highlights the complex economic biographies of individual vessels, and the tangled web of ownership.

hampered further by the failure of one of the engine turbochargers. Being so behind schedule the report implies that the speed was not reduced, even in such heavy seas. Rather tellingly the report outlines how the schedule-driven ethos of the container transport industry results in the will “to carry as much as possible as quickly as possible” (Marine Accident Investigation Branch, 2008:43). So, whilst the propagated image of containerisation and the wider supply chain management industry is one of increasing efficiencies (Cf. Paché, 2007) the unfolding events resulting in the beaching of the *Napoli* highlight a profoundly more complex image of such mobilities, where turbulent inefficiencies are pervasive presences, resulting in part from the desire for economic gains provided by the apparent ordering strategies of containerisation itself.

Defining the Accident:

Whilst the question of predetermination and prediction is clearly problematised by the affective conjoinings of heterogeneous actants, there are clear systemic, procedural, and of course at times necessary attempts to reinstate normative operations. Before considering this through the two main *Napoli* accident reports it is important to understand the accident as both concept and material outpouring. As we saw in the introduction to this chapter, the accident may straightforwardly be considered in terms of an unexpected occurrence. Work on the ‘accident’ in its broadest sense has been articulated in a variety of fields such as human geography (Cresswell, 2006:259-265; Hewitt, 1983; Wilford, 2008), sociology (Furedi, 2007; Perrow, 1999), politics (Davis, 2000) and in cultural and social theory (Arthurs & Grant, 2003; Massumi, 2011a; Sontag, 1965; Virilio, 2007). But perhaps the most useful place to begin to consider the notion of the accident is with the associated concept of risk (Beck, 1992). Straightforwardly speaking, “risks are potential dangers” (Arnoldi, 2009:35), that are manifested in numerous ways, through social instability, technological breakdown, political violence, or

increasingly with environmental disaster (Pupavac, 2012). Conceptually, risk is subsumed within the wider notion of uncertainty – what can we know, and what cannot be known? In light of this, there is a concomitant relationship between the risk of uncertainty and mitigating-against this through forms of governance and risk management (Ericson, 2006). Of central importance to the management of risk is the calculability and probability of knowing, or at least projecting, when uncertainties will manifest themselves through accident or disaster. Although we might differentiate between risk as the potential for uncertainty, and the accident as the manifestation of uncertainty, throughout the various explications the question of complexity is paramount, with discussions demonstrating the tensile relationship between uncertainty and control. Like risk, the accident troubles. It confounds the notion of stability and undermines certain expectations of how things will be. The accident is both unsettled and unsettling, a prophetic ‘spanner in the works’ of a seamless mode of operation.

In light of this, Blanchot offers a potential definition by suggesting that the accident opens up a “fundamental rupture”, a rupture that supposedly disables “tranquil discursive continuity” (Blanchot, 1995:8).¹⁰⁰ Such a rupture is an excess that cannot be contained: it is an outpouring that seeps out of the normal smooth laminar flow of continuity. Massumi (2011a:25) also describes the accident in these terms, seeing it as a “self-overflowing attack-force”; a force, like the swerve of the clinamen, that can emerge with the slightest deviation from the ‘normal’ (also see Callon, Lascoumes & Barthe, 2009:28). As we saw with Roberts’ discussion of error, there are a variety of intensities of excess. For example, a simple error suggests an occurrence that is within the proximity of control, and a form of “minor reordering that actually feeds the system’s positive evolution” (Massumi, 2011a:26). By contrast a systemic accident such as the Fukushima nuclear disaster (Acton & Hibbs, 2012), clearly testifies to a catastrophic excess, leading

¹⁰⁰ Although he is speaking of writing and discourse the figures of continuity and discontinuity are applicable to the discussion on the accident across a variety of disciplinary explications.

to “pansystemic disruption” (Massumi, 2011a:26). What links the various intensities of accident are the emergent conjoinings, and the unexpected kinships, where hybrid entanglements can either settle back into a state of semi-normality, or break out into an overflowing disaster.

However, to speak of the accident as “a panoply of cofactors” (Massumi, 2011a:26), or as an assemblage of hybrid conjoinings, is distinct from the rather more normative debates that pervade the established literature on the subject. Perrow (1999) in particular has attempted to elucidate the conceptions of the accident. For him the accident can be defined as “an unintended and untoward event” (Perrow, 1999:63). Whilst concurring with my own assertion of the unintended qualities of interaction it is clear that this definition could be expanded, and Perrow provides a further articulation of the accident as that which involves “damage to subsystems or the system as a whole, stopping the intended output or affecting it to the extent that it must be halted promptly” (Perrow, 1999:70). Although this offers us a slightly more grounded notion of the accident than my own conception of hybrid conjoinings, rather tellingly it is the *philosophy* of the accident that offers the most detailed account of the constitution of the accident *per se*. In particular it is out of Aristotle’s work on substance and accident that Virilio (2003; 2007) suggests the potential of the accident to *reveal* the technological imperative that produces the technological accident itself. In referencing Paul Valéry’s constructive claim that “the accident is the appearance of a quality of something that was hidden by another of its qualities” (Valéry, 1987:229 cited Virilio, 2007:6) Virilio is beginning to construct a specific spatial model of the accident that relies on a stratified constitution of the hidden and the apparent.

Aristotle’s work on the accident differs markedly from sociologically or geographically driven discussions of the accident, nonetheless his articulation of the accident as the *inessential* is a highly productive mechanism for appreciating how the

accident is seen in most quarters as the unwanted presence of uncertainty. For Aristotle, at the root of any person or thing there was a stable essence or *substance* that is indivisible and simultaneously un-ascribable to a specific, tangible object. By contrast that which is inessential is said to be ‘accidental’ (Hamilton, 2007:11). This inessential aspect of the accident emanates from the categories developed by Aristotle: categories that delineate a tenfold system whose purpose was to classify “the properties and relations that may be ascribed to substances” (Bambrough, 1963:133). The ten categories, consisting of substance, then quantity, quality, relationship, place, time, posture, state, doing something, and undergoing something (Aristotle, 1963:137) align our understanding of the accidental in this guise as that which is subordinate to the essence of substance. For Aristotle the power of the essential, in part, lay with its *stability*; it was a constant, ascribable certainty. The nine subordinate qualities of accident are by contrast shifting and mutable qualities that render the accidental *unstable*. It appears then that the critical factor leaking out of Aristotelian conceptions of the accident is the question of change. If something is not necessary over a period of time then it is deemed inessential or accidental. Hamilton raises an important observation concerning temporality, for the notion of the accidental as unstable posits a definition of the “accident in accord with the state of a thing at a particular time” (Hamilton, 2007:13-14).

In the case of standardisation it is possible to argue that standardised procedures and material entities themselves are akin to a mode of stabilisation, a means to limit or rather ‘re-identify’ change. Whilst it is problematic to simply conflate standardisation and substance, as has been outlined earlier in *Chapter Two* standardisation is a manifest attempt to stabilise change within a *flexible* system. This is to suggest that change itself does not lie outside of the essential, but rather that “substance provided stability by allowing a thing to remain itself within changing circumstances. It created a *reidentifiable subject of change*” (Hamilton, 2007:14 emphasis in original). As a re-identifiable change, or

as I term the role of standardisation, the *stabilisation of change*, we are privy to the way in which change itself resides in close proximity to intention—it is not an extreme or wholly unexpected shift, but rather a mode of change that is within the acceptable bounds of intention. Here then is the somewhat more contemporary representation of accident—that of an inter-dependent relationship between accident and substance, where substance is immutable but also tempers the mutability of the accidental. The ultimate power of the essential lies in this purported capacity to adapt to or withstand change. Although this may at first appear somewhat contradictory given the supposed immutability of essence, Hamilton points out that substances have the capacity to change: “In contrast to accidental change, which alters only the perceptible qualities that depend on substance, substantial change transforms one substance into another” (Hamilton, 2007:15). This qualitative difference is a powerful trope that highlights the capacity of substance to both accommodate and instantiate change at the level of the essential rather than at the secondary layer of the accidental. Change is both accidental *and* substantial in its nature. The latter is however qualitatively more powerful.

A further implication of this debate on lability, and one that produces a very useful definition of the accident in its broadest terms, is the *knowledge of when change will occur*. Such knowledge is related to the modes of foretelling and pre-emption that will be discussed shortly, but for the conception of the accident per se the unexpected nature of change is suggestive of the eruption of the accident as event. Expectation, purpose, intention; all three posit what might be termed the *comfort of knowledge*, a state of control that is central to the function of logistics. When Aristotle argues that the accidental occurs at a specific moment in time, this moment is in effect unexpected, or as Virilio has stated, the accident is “truly surprising” (Virilio, 2007:47). This element of surprise is key to the discussion, for it allows us to appreciate the importance of the operational logic of intention; that is, the specific purpose of commodity movement. We can see from this

rather expansive definition of the accident that a variety of intensities are present in designating the accident as unintended outcome: these could range from a gas valve rupturing (Jacobs, 2006), to a slight shift in the course of a ship. Aristotle's own examples are still valuable even with the length of time since their initial usage. Perhaps most famously his example of the sailor being blown off course by a storm points to the unexpected affect of the weather (see Langewiesche, 2004). As Hamilton argues this was due to "an external agent [interrupting] the intended outcome of the event" (Hamilton, 2007:18).

This returns us to the issue of uncertainty; of an excessive overflowing that evades the expected linear chain of events. As a result it is rather tempting to adhere to Easterling's evocative statement that "error is the beautiful improbability that escapes fortifications of logic" (Easterling, 2005:124). In a similar vein, although conceptually distinct from the discussions on logistics and distributive space, Blanchot's (1995) work on the 'outside' offers a reading where the disaster remains ungraspable: it can rupture the 'normal' and simultaneously remain outside of the confines of attempts to police such cracks in the edifice of the normal. However, both claims could be said to skirt over what Massumi sees as an "indeterminacy determined-to-be-determined" (2011a:25), that is, the attempts to reorder or to stymie the overflowing excesses of uncertainty. More prosaically, as implied by Massumi earlier in this section, reordering can emerge from such apparent excesses, be it through small-scale evolution, or in the case of the *MSC Napoli* accident through forms of systemic recalibration put in place by the *Napoli* accident reports. To which I now turn.

'Either/Or': Dividing the Accident and Non-Accident:

Much of how the events outlined at the outset of the chapter were reported in the media, but also in the accident reports, points to an intended set of thresholds through which

the various actors in the system should have moved, including the journey of the goods through the international shipping lanes of the English Channel, as well as the behaviour of local residents, who it was assumed would return stolen flotsam, rather than selling many of the items on eBay (Morris, 2007). Although the argument in this section is that such a notion is reductionist, this is not simply to argue that the contingent, hybrid conjoinings of relations leads to permanent disorder. Instead, Douglas asserts that as individuals we attempt to create stability by placing objects and experiences in a structured pattern, so that discordant objects can be rejected accordingly (Douglas, 2007:45). This is to acknowledge the ordering processes that clearly abound alongside the animated contingency of relational hybrid conjoinings. The temporary nature of this momentary glimpse of the commodity distribution system torn open is highlighted by the almost instantaneous recalibration of the system through the management of the accident itself, but also through the post-accident reports mentioned previously: these can be termed modes of (re)ordering, so as to reflect the earlier discussions in *Interlude I*.

Following the grounding of the *MSC Napoli* immediate attempts were made to re-secure the system, primarily through the work of the Maritime and Coastguard Agency to manage the accident, and as well as the various other agencies involved, including the Receiver of Wreck, whose job it is ensure the return of lost goods. These clear-up operations at Branscombe Bay represent both the recalibration of the accident but also the various stages through which the system passes. In particular, the two reports provide a useful perspective from which to consider the modes of (re)ordering more fully. Both reports testify to the central argument of turbulence theory discussed in *Interlude II*: order can emerge from chaos. The findings of the MAIB report are decisive in terms of attempting to reformulate the system so that the potential for similar accidents to occur in the future are reduced. Indeed, one of the valuable aspects of the MAIB report was that as a result of the accident it identified the structural inefficiencies of this particular

class of container vessel, thus leading to some 1500 similar ships being screened, and for a recommendation that “technological aids for measuring hull stresses on container ships” be developed (Marine Accident Investigation Branch, 2008:1). The eight recommendations of the full *MSC Napoli* public inquiry (Mercer, 2009) provide an interesting adjunct: this attempts to reassert a form of systemic stability, where potential incidents in the future are managed centrally (also see Dorner, 1996). In this it differs from the stated aims of the MAIB more broadly, which is “the prevention of future accidents through the ascertainment of its causes and circumstances” (Merchant Shipping Regulations, 2005:4; also see Beer, 2008). In this guise the work of the MAIB reflects the wider risk management approach of inductive reasoning, where the measurable probability of a future accident happening, and mitigating against this, is based on the knowledge and examination of previous events. By contrast the public inquiry suggests that to assume “that it [a maritime accident] will never happen again is not a sensible contemplation” (Mercer, 2009:3). Instead it focuses on the need for *preparedness* as opposed to prediction, where “a half-decent contingency plan must prepare everyone concerned for the worst” (Mercer, 2009:3). In this aspect the public inquiry adheres to Anderson’s definition of preparedness as the preparation for the aftermath of events (Anderson, 2010:790; also see Lakoff & Collier, 2010). Most notably with regard to this is the identified need to reformulate the National Contingency Plan (Maritime and Coastguard Agency, 2006), to ensure that the authority for control is made clear to the parties involved, a situation made all the more striking by the differentiation between land and sea-based incidents (Mercer, 2009:15). So although the reports approach the recalibration of the system through the management of uncertainty from somewhat different perspectives, they both adhere to the central problematic of instituting higher-levels of order (be they predictive or preparatory) that emerge from turbulence.

Hewitt’s work on the shifting terrain of how natural hazards are viewed is an

instructive example of the role played by prediction within the field of hazards research (Hewitt, 1983). Prediction (or pre-emption) is governed by the potential to foretell the occurrence of an impending accident or security threat through a variety of means, most notably via “statistical techniques and inference” (Hewitt, 1983:20), or through reasoned, measured interpretation, as seen with the MAIB report. Such modes of predicting the future are premised on a model of the past that is recursive as well as controllable; the predicted world of the future acts just as the past. Foretelling is itself an instrument of control. As Hewitt so astutely notes, this mode of reasoning does not engage with the complexity of the everyday, but instead renders the problem of the potential accident as eminently knowable and thus controllable, characterised above all by the principle of spatio-temporal management whose “interpretive structure involves treating everyday life and disaster as opposites” (Hewitt, 1983:22). Such practices and techniques of securitisation present a ‘neutered’ rendering of the complex assemblage of the accident itself. However, whilst both reports recognise the nature of systemic failings they still cleave to a world-view premised on the potential for reorganisation and re-stabilisation (Wolfe, 2007:xv). They problematically assume that stability can be reformulated through the coherent dissection of the accident, illustrated through the use of individualised recommendations. This stands in contrast to Massumi’s (2011a:24) argument that “an event as yet to be determined” produces unbearable pressure. In the case of the MAIB report the sixteen key contributing factors are identified, leading to a situation where the multiplicity of non-coherent facets and hybrid conjoinings of the accident are subsumed by a set of reasoned means to deal with the complex *event* of the accident (Law 2004:93-100; also see Brown, 1998). It is arguable whether the reports—as modes of address—can ‘get at’ the unfolding, localised and emergent kinships. Indeed as Law points out with regard to the report on the Ladbroke Grove rail disaster in London, such an approach adheres to the belief that “a coherent account of the world is possible even at moments

when things have gone dreadfully wrong” (Law 2004:96).

As we saw in the earlier discussion of the meaning of the accident, it is clear that Aristotle’s work on the accident posits a complex rendering of the relationship between certainty and uncertainty, stability and instability. Perhaps the latter issue of instability is the most telling indictment of the accident as seen by the advocates of logistical power. Part of the process of re-stabilisation is not solely to put in place material transformations and protective measures to limit the potential for future accident. As the section below will argue the definition of the accident is dependent on the ontological designation of that which the accident is not. One of the primary mechanisms for instantiating a separation between accident and non-accident is the role of the semantic (as well as material) divide. This is the ‘either/or’ of this section’s title (see Massumi, 2011a:24). Some time ago Hewitt noted the importance of “un-ness” in the articulation of accident or disaster (Hewitt, 1983:10). He suggests that how an accident or disaster is viewed depends on the divide between the normal and the abnormal. He states that, “disasters are *un*managed phenomena. They are the *un*expected, the *un*precedented. They derive from natural processes or events that are highly *un*certain” (Hewitt, 1983:10 emphasis in original). Their ‘un-ness’ is tantamount to a distinction between normal functioning of movement in this case, and the abnormal eruption of the accident. But Hewitt’s argument stresses the importance of how the normal and abnormal are viewed. Primarily, a hazard, disaster or accident “are not viewed as integral parts of the spectrum of man-environment relations” (Hewitt, 1983:10). Instead they are separated.

The idea of the recalibration of the accident/error through risk and disaster management, as outlined above, intimates just how important the relationship between accident and non-accident is. According to Hewitt (1983:5) the dominant view of research on natural hazards and disaster at this time was premised on the simplistic assumption of ‘extremes’, suggesting that disaster occurred where the operation of

physical processes exceeded the 'norm' (also see Sontag, 1965:42). These natural disasters were attributed to "the chance recurrences of natural extremes" (Hewitt, 1983:5); for the dominant view of hazards research the operation of chance was a crucial factor, as it placed these natural forces within a realm of potential social action that could administer control. Hacking's (1990) work on chance is instructive in outlining the shifting social and philosophical attitudes toward the 'freedom' accorded to uncertainty. The taming that he alludes to in the title of this book is "the way in which apparently chance or irregular events have been brought under the control of natural or social law" (Hacking, 1990:10). Here then the overarching desire to control extreme natural forces is demonstrated from a philosophical and pragmatic standpoint. These approaches stem from a specific, established mode of viewing the natural and social worlds as controllable. However, as Hewitt's work somewhat presciently foretold, the notion of extremes is rather limited in the face of the conceptual lessons of complexity and turbulence theory. And this has been addressed decisively in more recent approaches to the role of uncertainty in risk and disaster research, an issue I address at the close of the next section.

The Ever-Presence of the Accident:

Distancing is an act of distortion. It creates a supposedly objective perch from which to view reality (Law, 2004:24). The hybrid conjoinings that were outlined above testify to a much more complex make-up, specifically in terms of the distance between the accident and non-accident. I assert that there is no divide or distance between accident and non-accident; instead they are immanent to one another. The technological, like the natural accident, can be said to adhere to a mode of viewing error as illegitimate. There are, however, some distinctions to be made between the natural and artificial accident in terms of immanence. Above all I argue that the standardised accident is a specific case of

the proximity between the accident and normative operation. According to Virilio the critical difference between the ‘natural’ calamity and the ‘artificial’, man-made accident is that the latter is technologically determined (Virilio, 2007:9). With the technological accident a variety of tropes specific to Modernity become evident, but for the present argument in particular the role of *standardisation* is paramount. If we accept Virilio’s dictum, then such systems of repetition that standardisation represents ultimately lead to the repetition of the standardised accident. That is, the technological accident is one that is determined by the standardised mechanisms of technology itself, leading to the *spread* of the accident through the entire network of standardisation.¹⁰¹ As outlined in *Chapter One* the overriding condition of the standardised procedures of containerisation is the ability to interchange various elements in the network. As Lefebvre notes, there is a lack of uniqueness in such spaces of repetition resulting in conditions of *duplication* (Lefebvre, 1991:75). My argument is that the modes of duplication that typify spaces of standardisation result in the duplication of error due to the various examples of hybrid conjoining, an issue that will be developed further in *Chapter Four*.

This technological twinning of the normal/extra-normal produces an about-turn of the normalised viewpoint of the accident, and instead generates a new vantage point, that has been termed the “philofolly” (Virilio, 2007:6). This is an acceptance, or more so a ‘love’, of that which was typically repressed by the dominant logic of capitalist Modernity, in this case the undoing of order by the accident. This point is central to Virilio’s thesis on the accident as a form of “indirect production” (Virilio, 2007:5). The accident is the production of an alternative that is simultaneous with the original: to produce is to simultaneously produce its undoing, its un-production, as noted earlier (see Hewitt, 1983:10). So, whilst there was a shift in the logic of control ushered in with industrial

¹⁰¹ A similar line of reasoning has been developed by Wolfgang Schivelbusch with regard to the railway. He notes that, “after the Industrial Revolution, destruction by technological accident came from the inside. The technical apparatuses destroyed themselves by means of their own power” (Schivelbusch, 1986:131).

standardisation there is also an immanent logic in its undoing, a destabilisation of the hierarchy of production and failure where the accident can be said to *precede* the productive functioning of all systems. Although such temporal folding may at first appear problematic, Virilio validates this in his assertion that “the shipwreck is consequently the ‘futurist’ invention of the ship, and the air crash the invention of the supersonic airliner” (Virilio, 2007:5). With Virilio’s temporal folding of the accident onto the production of the technological artefact there is a distinctly topological dimension to the relationship between the accident and non-accident. In a manner similar to Roberts (2011:109-155), Virilio also makes significant use of the accident’s visible/invisible dimensions, arguing that “the accident is an unconscious oeuvre, an invention in the sense of uncovering what was hidden, *just waiting to happen*” (Virilio, 2007:9 my emphasis). In this situation the mode of the ‘real’, if you like, is the visible speed of the technological, whereas the accident is the invisible. This provides ‘contemporaneousness’ between non-accident and accident, positing the co-presence of one in the other—accident-in-non-accident, non-accident-in-accident. They are in one another; the accident is ever-present in the non-accident.¹⁰²

Just such an argument was developed by John Locke in his text *An Essay Concerning Human Understanding* (Locke, 1975). Locke argued that accident and substance were in fact commingled. In his work some important shifts in the ‘topography’ of substance/accident are evident, particularly the recognition that the accident offers new modalities of knowing the world. It does of course have to be recognised that the specific discourses on knowledge that we see in much of this discussion are in some sense abstracted from the quotidian repercussions of mobility. Nonetheless, the nature of the accidental *event* in particular permits a concurrent rendering of the accident in space and time as specifically experiential. Hamilton specifies that Locke’s work relies on the

¹⁰² It is clear that the ever-presence of the accident clings to Derrida’s work on the ‘lost letter’, where every letter has the potential to not arrive, to be lost or held in permanent abeyance: “A letter does not always arrive at its destination, and from the moment that this possibility belongs to its structure one can say that it never truly arrives, that when it does arrive its capacity not to arrive torments it with an internal drifting” (Derrida, 1987:489).

accident to provide verifiable evidence of the world in *process*, arguing that his “experiential focus viewed accidental qualities as primary sites of new knowledge, reversing their former subservience to substance and making them essential elements in the construction of scientific hypotheses or proofs” (Hamilton, 2007:127). Transparently there is a shift in the appreciation of the constitutive modalities of the hierarchy of substance and accident, but rather than a simple reversal of hierarchies Locke’s work is suggestive of a closer binding of the two factors into a shared continuum of operation.¹⁰³

Most importantly for my overarching argument in this chapter is the way in which Locke’s engagement with the accidental as the ‘site of new knowledge’ exemplifies the ‘creative’ potential of uncertainty in broader terms. The grounding of the *Napoli* posits the idea of turbulence as a productive fluctuation. Although it may appear rather distanced from the effects of the beaching (including the environmental damage) the potential of turbulence is demonstrated by this accident. It *reveals* the distributive space of capitalism. Turbulence literally exposed the stringent practices and procedures in place to try and maintain the flow of commodities. The approach of Callon, Lascoumes and Barthe also recognises the potential that accidents (or ‘controversies’ as they term them) provide by revealing “events that were initially isolated and difficult to see” (Callon, Lascoumes & Barthe, 2009:28). The hidden infrastructures of domination (in this case distributive space) are often only revealed through the ‘productive’ eruption of error or accident (also see Graham, 2010:3). This folds back to the opening debates in the *Contextual Introduction* concerning the lack of visibility of distribution space – the apparently ‘magical’ arrival of goods in spaces of consumption. In simple terms the flotsam washed-up on the shore at Branscombe Bay are emblems: they are visible markers of global complexity and the liveliness of matter. But as the term hybrid

¹⁰³ In his discussions of probability and certainty Locke argued that they exist as part of a simultaneous milieu, in a “shared continuum” (Hamilton, 2007:121).

conjoinings is intended to emphasise, they are also indexes of the relational interactions of a multiplicity of actants that came together in that singular instant on the 18th January 2007. Above all, they are traces of the infrastructural power of distributive space, albeit temporarily disordered. However, the act of revealing is not concerned with establishing the ‘truths’ of something, but rather making it *critically* intelligible, through what Joan Retallack terms “defamiliarization” (2003:28). So the swerve of unpredictable interconnections that led to the *Napoli* accident can be used to foster sustained investigation of capitalism’s geographies by providing another way of looking. It thus leads into a wider discussion of productive uncertainty. For Retallack again, forms of novelty afford us with what she calls “an atmosphere of uncertainty” (2003:22). Such an air of indeterminacy is the very means through which change occurs. It is the stimuli for new forms of thinking to emerge. It is a challenge to the political and ethical surety of cleaving to modes of ordering.

Echoing Anker’s (2009) work on the ‘ethics of uncertainty’, such a position outlines the inherently ethical dimension of change, where new forms of thinking, and new forms of praxis (Roberts, 2011) can materialise. And this leads onto a rather more grounded approach to the question of the accident. Although the environmental and insurance costs of the clean-up operation cannot be disregarded, there is potential in the swerve. As we saw, it led to the establishment of measures to counteract potential future maritime accidents in this class of vessel. It resulted in recognition of the institutionalised greed of the shipping industry. And it also raised the implications of the speed that vessels sail at in high seas, as well as exposing limitations in the National Contingency Plan. In this regard we can see the relationship to recent changes in the way error, uncertainty or risk are viewed in organisations, not solely in terms of disaster management. For there have been productive uses of error as a ‘creative’ element in organisational performance: “whatever the desire to eradicate error, it is also treated as an

enriching ingredient that an organization or a mind must continually cultivate” (Easterling, 2005:128).

Although we saw in the previous section how traditional forms of disaster management cleave to the notion of modes of (re)ordering—in Hewitt’s terms through a form of ‘un-ness’ as divide—Graham and Thrift (2007:5) make the point that,

“perhaps we should have been looking at breakdown as no longer atypical and therefore only worth addressing if they result in catastrophe and, instead, at breakdown and failure as the means through which societies learn and learn to reproduce”.

This is the qualitative intensity of difference between systemic evolution, and total disruption. With the former in particular we see a growing body of literature (especially in organisational management studies (see Clegg, Kornberger & Rhodes, 2004; 2005; Rhodes & Milani Price, 2010)) that utilises the values of uncertainty and disorganisation in the name of dynamical flexibility within organisational structures and response management. In the context of risk and disaster management a similar shift in how uncertainty is dealt with is evident. Although the calculative logic of probability and the power of the insurance industry are still dominant, Arnoldi (2009:37) notes that awareness of the inability to totally insure against or predict uncertainty is growing. Part of the rationale for such a shift is due to the recognised fallibility of highly complex and interconnected systems. So, “rather than believing that all risks can be accurately known, assessed and managed, the conception is now that in many cases uncertainty remains and that some risks should therefore not be taken” (Arnoldi, 2009:34). Such an argument fosters the sense that managing uncertainty is a fallible project. To an extent this is the position posed by Power (2004:61) when he argues—like the literature from organisational studies—that forms of “disorganisation and ambiguity” should be utilised in risk management. In doing so forms of experiment, flexibility, and creative learning are

said to emerge.¹⁰⁴ His final point is markedly different from the approach still adopted in the MAIB report for example. He states that risk management should “depend essentially on human capacities to imagine *alternative futures* to the present, rather than quantitative ambitions to predict *the future*” (Power, 2004:61 emphasis in original). This appears to be at odds to traditional inductive mechanisms to pre-empt future occurrences. As he also points out, this is not simply to aspire to a fully open process of disorder, but rather it implies the increasing importance placed on preparedness, as we saw with the main *Napoli* inquiry report (Mercer, 2009).

However, there is a decisive qualification to be made. Whilst this reconfigured notion of error, breakdown and accident has been promoted as a generative tool in organisational change, and in how uncertainty may be viewed, it remains clear that there is a strong recuperative operation at work, again depending on the intensity of uncertainty. In particular, at the far end of the spectrum Massumi identifies how “full-spectrum paramilitary power enters the co-conditioning fray with the mission to act as a synergy dampener: to stanch perturbatory amplification and its intersystem propagation” (2011a:26). In the context of military response to natural disasters such as Hurricane Katrina the accident milieu becomes a generator for negative social change and the entrenchment of established social forms of exclusion on the basis of race and class (also see Protevi, 2009), all under the auspice of ‘dampening’ the effects of an environmental disaster in this case. In this guise both preparedness and the management of accidents or disasters can lead to a post-disaster politics that institutes new social and economic regimes of control (Deleuze, 1992b), many of which could be seen as more repressive than the pre-disaster landscape (Klein, 2007).

¹⁰⁴ Unsurprisingly perhaps the use of terms such as flexibility and adaptability in this context echo a similar usage in the logistics literature, especially in logistics theories including Lean Six Sigma, as discussed in *Chapter Two*.

Conclusions:

This chapter has dealt with aleatory forms of relation that exceed our ability to preempt—with certainty—the future. Obviously the discussion of the accident has focused more on specific types of relation, and where these perceivably breakdown. But above all the intention of the chapter has been to develop the debates in *Interlude II* and apply these to the complexity of interconnections in distributive space. Whilst this line of reasoning will be developed even further in the next chapter, the notion of hybrid conjoinings in particular has here served to underline DeLanda's notion that capacities of externality exceed prediction. Elements within any milieu are part of a contingent unfolding, resulting in a situation that Massumi describes as “the arrival of the new” (Massumi, 2002:214). The contingent couplings between actants that are supposedly divided lead to new ways of viewing distributive space, as Locke's work perhaps suggests. These, I argue, are generative entanglements of the material and spatial.

To restate my point in the introduction to this chapter: there is something ‘creative’ in the uncertainties produced by the *Napoli* accident, most notably the revealing of the infrastructural modes of ordering that constitute distributive space. In suggesting this I am not ascribing to complete disorder, but rather that the notion of the accident (or uncertainty) allows us to view the ongoing tensions and divergences between order and disorder, including the constant attempts by systems “to reconstitute and reorganize themselves” (Wolfe, 2007:xv). An essential factor that emanates from discussions on complexity is the interlacing of ‘opposing’ elements; order and disorder are imbricated in one another, differing forces in an assemblage of relations. With this appreciation the standard hierarchies of Modernity are overturned: there are ongoing tensile relationships of co-presence between order and disorder. If we conceive such emergent, turbulent relations as inherent to mobility then we can acknowledge the presence of continuous, ongoing tensions in the armature of mobility as opposed to the re-optimisation of stable

modes of ordering.

In this way I have tried to attune to Massumi's opening comment on the ever-presence of anomaly: a view of the world that accommodates contingent processes of worlding. However, the discussion of error, accident and risk opens up interesting debates on how forms of anomaly are dealt with. We saw that forms of error can be productive presences in instigating organisational change. In this context, complexity could be seen as a constructive tool for systemic development. This was at the core of my argument concerning the findings of both the MAIB and main *Napoli* public inquiry reports: through these, changes to the maritime freight industry have been instigated. Nevertheless, as the previous section articulated (and as Roberts' (2011) work also does) there are qualitative differences between an accident as productive, and an accident as destructive. In the latter case we can see a rather normative conception of the need to construct perceptible divides between error and the proposed conception of the 'normal'. Even in the case of the two *Napoli* reports the problem lies with how these 'positive' uncertainties are framed and conceptualised. In different ways both reports still cleave to a sense of policing uncertainties either through pre-emption or preparedness, rather than the potential of uncertainty.

In this regard they continue the traditions of risk and disaster management where part of the calculus of control is predicting when and how a future accident may potentially occur. On the other hand, given the ever-presence of the accident as argued above, the answer to this may be that it is always there; it is always present. If we are to recognise the ever-presence of the accident within the mobility assemblage then the assumed ability to control the potential accident becomes somewhat destabilised. As such we move away from an emphasis on ordered upkeep toward the ongoing "transitions and bifurcations" (Latour, 1987:94), the interferences and inter-relations between order and disorder, typified in this case by the grounding of the *MSC Napoli*. Overall then it is

suggested that the recognition of the accident as ever-present is a valuable means to consider the vital importance of the role played by the multiple forms of hybrid conjoinings. With this in mind we can recognise that distributive space (and mobility more widely) is a generative process of constant failure and re-calibration—a meshwork of competing relational forces.

Chapter Four:

The Noise at the Door: Parasitic Adjustment, (In)visibility and the Transformative ‘Openness’ of the Shipping Container as a Smuggler-Object

Introduction:

“It is not only a question of the logical. What travels along the path might be money, gold, or commodities, or even food—in short, material goods. You don’t need much experience to know that goods do not always arrive so easily at their destination. There are always interceptors who work very hard to divert what is carried along these paths. Parasitism is the name most often given to these numerous and diverse activities” (Serres, 2007:11)

The meshworked assemblage of competing relational forces is a continued focus of this chapter. However, where the previous chapter was concerned with aleatory forms of relation that exceed our ability to predict, here I turn to the interplay between seemingly stable relations, and their immanent instability through the *parasiting* of their networked formations. To begin, I turn briefly to the work of a Romanian artist, Matei Bejenaru. His work, ‘Travel Guide’, is testament to the circumvention of border security practices. It illustrates the complex relational forces that populate the mobilities assemblage: those parasitic forces that ‘divert’ the smooth flows of contemporary capitalism. Taking the form of a fold-out mock-guidebook the version presented as part of *The Irresistible Force* exhibition at Tate Modern, London (September 2007) consisted of a series of instructions and tactical suggestions for travelling illicitly from Romania to the UK or Ireland, detailing the different means, be it by bus, plane, train, boat or shipping container.¹⁰⁵ Whilst framed within a cultural context (also see *The Wire*, 2004) one may read this as a useful guidebook for transgressing the bordering practices of Schengen space (Verstaete, 2001), for it outlines a variety of tactical measures that individuals who are ‘sans papiers’ would have to undertake in order to gain entry to the UK or Ireland.

¹⁰⁵ The version presented at Tate Modern stated that on 1 January 2007 when Romania joined the EU there was no longer a need for Romanians to obtain visas, allowing them to travel freely to the UK and Ireland. Whilst this may apparently nullify the potency of the project it does however make evident the shifting bounds of inclusion, for it is clear that such a model of transgression can apply to numerous other individuals seeking means of inclusion in various geopolitical contexts.

Accompanying the text are a number of maps and photographs similarly outlining points of entry, including the location of shipping container terminals (Figures 29 & 30). The text is a practical one that identifies the drawbacks of travelling by bus from Romania, due to the fact that the majority of legal and illegal migrants travel by this means. Whilst the French ports of Calais and Le Havre are deemed treacherous, given that the only practical means of crossing the English Channel is by stowing away in shipping containers or in the rear of roll-on-roll-off lorries, the guide outlines the practical measures needed to infiltrate such spaces. It is suggested that before attempting to install oneself in a container one needs to enter the port by dressing as a dockworker – “dressed like this, you can enter Quai d’Atlantique without having any problems through one of the access gates after the lunch break, when you can intermingle with the other workers” (Bejenaru, 2007:no page). Once in the port it may be possible to bribe one of the workers. ‘Travel Guide’ also outlines the need to obtain information about the date, time and destination of the container ships, obtainable via publicised information. As the exit/entry ‘vehicle,’ the shipping container can be infiltrated through the information provided by the text, including a diagram showing the locking mechanism of the containers (Figure 31). Other essential facts, such as the location of air holes, are given and it also states that “it is necessary to have at least four litres of mineral water, several chocolate bars, bread and dry salami, some pills, a flash lamp, a lever and pliers” (Bejenaru, 2007:no page).

The tactical measures outlined in the guide are revealing. They suggest the interplay between the efficiencies of global commodity mobilities and the harnessing of these self-same trajectories for illicit corporeal mobilities. This work also provides an important reference to the ‘undoing’ of security practices, for although the technological apparatus of border practices attempt to produce spatial closure there are always means of leveraging

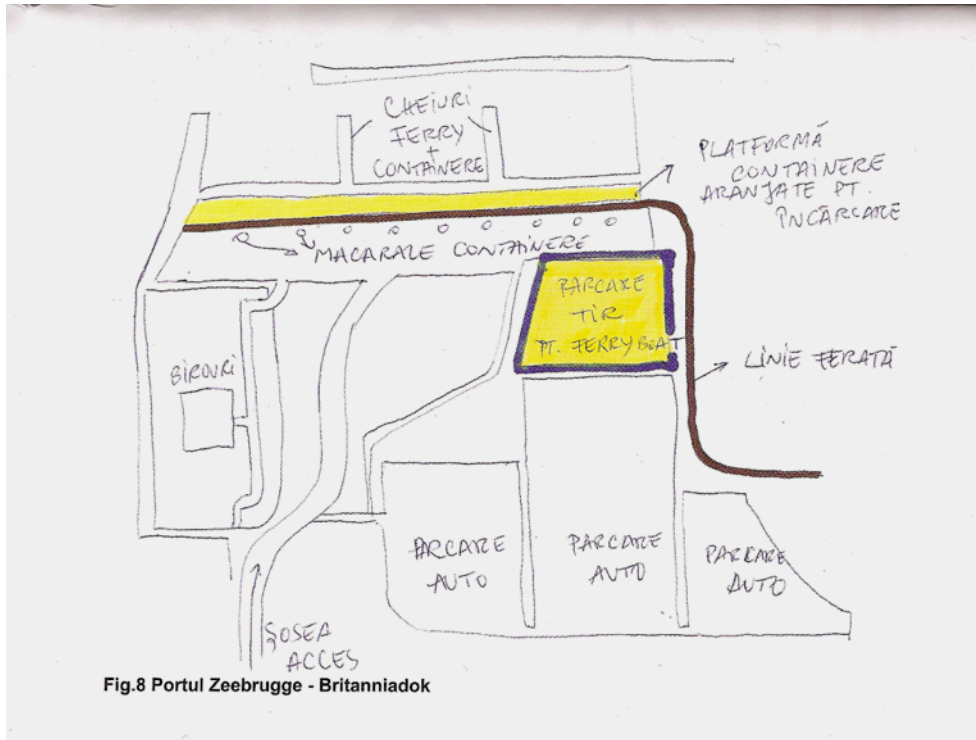


Figure 29: Hand drawn map of the Port of Zeebrugge from 'Travel Guide' (Source: Bejenaru, 2007:no page)

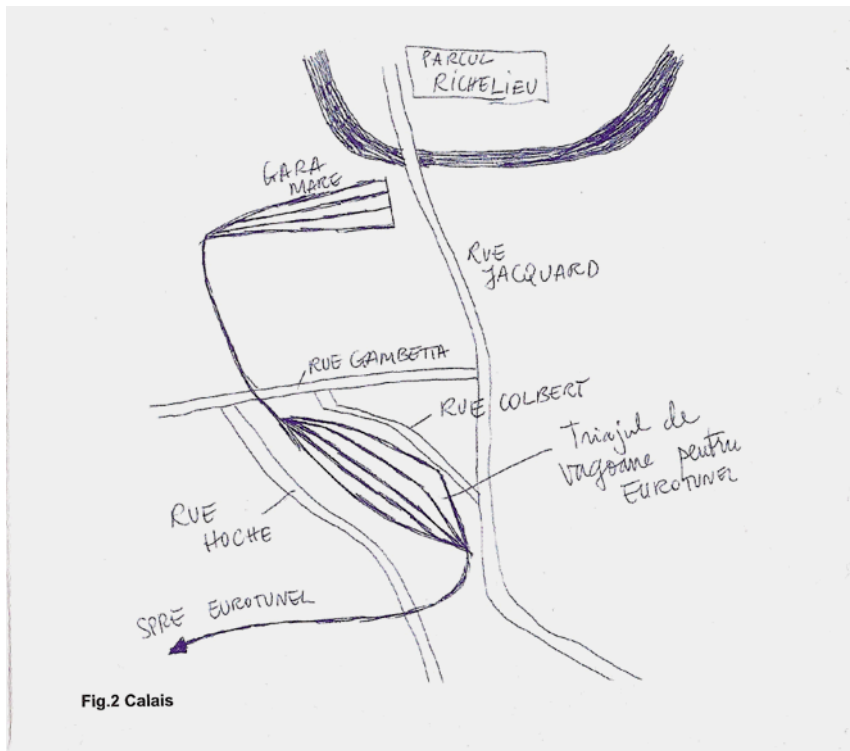


Figure 30: Hand drawn map of Calais from 'Travel Guide' (Source: Bejenaru, 2007:no page)

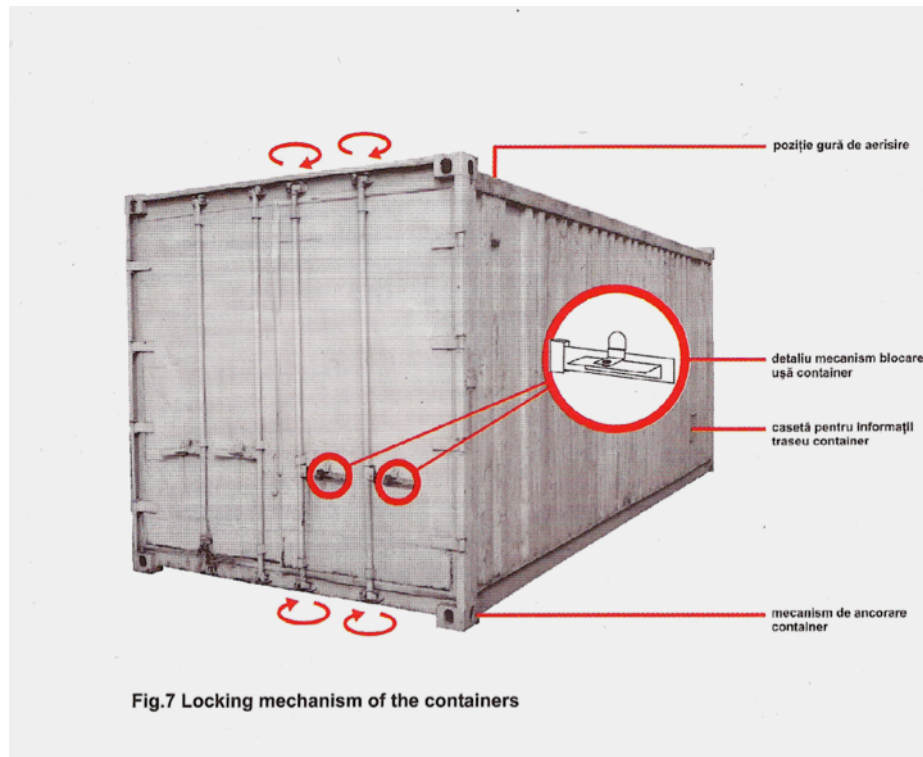


Fig.7 Locking mechanism of the containers

Figure 31: Container Diagram from 'Travel Guide' (Source: Bejenaru, 2007:no page)

open points of entry through bribery and corruption. In part this is concerned with what I term in this chapter 'smuggling logistics', a form of tactical-logistical knowledge and expertise (de Certeau, 1984) that *parasites* and utilises the interconnectivity of commodity flows. In effect the knowledge and practices that human smuggling gangs or stowaways employ represents an illicit form of logistical or infrastructural power: rather than the management and control of sanctioned interconnection, this alternative form utilises the perceived stability of the geographies of interconnection. Equally, via this tactical undoing of spatial control it is possible to position this example as an attempt to challenge border practices that sanction only those persons (or objects) that are deemed 'legitimate'.

As attested to by the discussions in *Chapter Two* on the implementation of the Container Security Initiative (CSI) and the ISPS Code, the securitisation of the trade lanes and commodity flows into U.S. sovereign territory highlights the perceived fallibility of

containerisation itself, and signals the potential of shipping containers to be ‘diverted’, for them to serve as terrorist weapons in their own right (Office of Policy and Planning and Office of International Affairs, Container Security Division, 2006:2). Added to this, CSI admits that a central concern of the U.S. government is the potential of ‘parasited’ containers to enter U.S. territorial space due to the quantity of containers entering the country:

“To understand the extent of the U.S. security vulnerability growing out of international trade, it is important to understand the size and complexity of that trade. Since an estimated 95 percent of U.S. imports move by sea, the security environment must place a premium on detecting, identifying and tracking terrorist networks with interests in disrupting maritime commerce. [...] Of over 100 million containers which moved through the maritime transport system in 2005, about 11 million arrived and were offloaded at domestic seaports in the United States, according to the Port Import Export Reporting Service (PIERS). The volume alone acts as a significant enticement for a cargo container to be used as a conveyance for terrorism. Historically, containers have been used as a vehicle for the smuggling of contraband and human beings into the United States. The extension of these illegal activities into the realm of terrorism is a plausible but unacceptable outcome” (Office of Policy and Planning and Office of International Affairs, Container Security Division, 2006:11).

So, whilst the sheer quantity of containers traversing the globe confirms the economic and political power of containerisation, it also points to the “serious difficulties encountered in knowing, at any time in the transport chain, where they are, where they are transported to and, above all, what they contain” (International Maritime Organization, 2004:23).¹⁰⁶ Such claims, by both the International Maritime Organization and the CSI exemplify a range of core issues in this chapter, including: systemic vulnerability due to the quantity and complexity of maritime trade volume; the ‘potential’ of containers to act as illicit spaces for smuggling weapons, contraband or people; and the circumvention of security measures due to the previous two issues. Fundamentally it challenges the apparent legibility of global commodities flows, an issue also demonstrated

¹⁰⁶ Although they are far from widespread in the containerised freight sector, RFID technologies are seen to be increasingly important in overcoming such systemic opacity. In particular, companies such as Savi Technology manufacture RFID sensor tags that can be affixed to a variety of containers.

by the lack of knowledge of container weights, as discussed in the previous chapter.

In part this chapter attempts to build on and develop a number of these arguments, especially the notion of an exchange between stability and instability. It also takes its lead from the theoretical positions outlined in *Interlude II*, with an emphasis on the mobilities assemblage, whilst also returning to discussions raised in *Part One* of the thesis, especially that of the link between legibility, stability and their immanent Other. For, as Anker insists, “the incessant change and flux of all phenomena (whether it be named subject, object, or thing) disallows any true stability or absolute form of certitude, for as something is coming to be it is always already becoming other” (Anker, 2009:83). On this point in particular the arguments here seek to problematise the assumed stability of interconnectivity associated with the systemic power of containerisation, and insist upon recognition of the constant presence of the disorderly.

The conceptual framework employed to do so, whilst folding back into the debates in *Interlude II*, is that of Michel Serres’ reading of the parasite (Serres, 2007). This provides a twofold approach: firstly, it emphasises the notion of *harnessing* extant forces, in the classic sense of guest/host relations (Lewis, Campbell & Sukhdeo, 2002:338); secondly, the Serresian rendering of the parasite develops a more complex armature (and a primarily non-biological one) which questions perceived hierarchies of relation between guest and host, and thus between legitimacy and illegitimacy. The question of legitimacy resides within the previous discussion of separating good from bad relations i.e., binary relations. It is argued in the first section of this chapter that the very idea of legitimacy becomes problematised when one considers the question of origins. So, if ‘legitimated’ mobilities may be said to reside within structures of domination, such as supply chains that have been developed out of military logistics, then the notion of illicit mobilities has to be addressed with this in mind. It is clear from Serres’ position that all new systems of

knowledge and practice open new arenas of vulnerability or aporetic spaces of uncertainty (Anker, 2009) or transformation. So, just as Virilio's work on the standardised accident acknowledges how standardisation standardises the accident, spreading potential error throughout the system of standardisation, the implications of containerisation are that it too creates new spaces of disorder and immanent misuse. The discussions on the drive toward containerisation in *Chapter One* focussed on the supposed efficiencies of unitisation, emphasising the increased speed for commodity transfer through the interconnectivity of intermodalism. We also saw how the standardised ISO intermodal container offered protection of the cargo, as well as reduction in theft at ports. However, Mars' (1983) work on work-based crime provides an interesting adjunct to this. He offers a wide-ranging overview of the relationship between organisational structures in workplace settings and the simultaneous ruses and forms of subterfuge employed by employees to 'work the system'. He also highlights how new systems developed to alleviate workplace crime create further systems of subterfuge, from supermarket cashiers developing novel means of taking till money (Mars, 1983:65-69) through to containerisation itself: "the introduction of containers has reduced these opportunities [for theft], but it has increased others – not least because of what can be concealed in containers" (Mars, 1983:6). These forms of tactical reaction are responses to ordering strategies, and the theory of the Serresian parasite is identified as a productive means to address and critique the interplay of forces between perceived forms of legitimacy (control) and illegitimacy (wilful attempts to undermine such control).

The chapter attempts to deal with such problematics by addressing illicit or unsanctioned mobilities. It does so—as intimated at the outset of this chapter—by considering smuggling practices, the intention being to signal the wider concept of distributive space and the global logistics apparatus. These are not simply normative distribution systems; they are sites of continuous contestation and control. It is to this

dynamical relationship that this chapter speaks. This is precisely why smuggling offers a valuable means of addressing the dynamics of distributive space, in relation to the “embeddedness of illegality in legal networks” (Hall, 2010a). Like piracy, it fosters an appreciation of multiple forms of production, distribution and consumption (see Starkey, 2001:108). Given the desire to address the wider dynamics of these relations the notion of smuggling used here is admittedly rather broad, including people smuggling, practices of stowing away, as well as contraband smuggling. This is not intended to suggest that all such practices are equivalent or laced-through with the same geographies. So, whilst I focus on the surreptitious use of extant commodity flows for people smuggling, contraband smuggling and the mobilities of stowaways, it is manifestly clear that such forms of smuggling are only a small part of the complexity of illicit global flows. For example, in the case of tobacco and narcotics smuggling, a variety of means are utilised, in part to obfuscate identification of recognised patterns of distribution. These include the use of ‘parallel’ supply chains where narcotics smugglers control the entire illicit pipeline from end to end (SOCA, 2009/10:31), and likewise in the case of counterfeit tobacco smugglers (HM Treasury/HM Revenue & Customs, 2006:13). Equally, there are much smaller scale distributive tactics, such as the use of yachts to smuggle cocaine from the Caribbean to the UK, under the legal guise of yachting-season mobilities (SOCA, 2009/10:31). Likewise, Castells has acknowledged the supply chain configurations of drug smuggling into North America, noting the early use of human carriers through to more ‘formalised’ infrastructure such as aircraft landing strips in the Bahamas. But, he states:

“Many other ways were and are used, as seizures by customs officers increased: commercial airlines, cargo ships, personal couriers, cocaine hidden in legally exported merchandise (construction materials, glass panels, fruits, cans, clothing and so on), as well as, particularly in the 1990s, land transportation across the Mexico-US border” (Castells, 2000:197).

Castells' observations demonstrate how the distribution of illicit narcotics is, in part, dependent on established supply chains often utilising extant mobilities. For my approach the decisive factor is the *concealment* of illicit goods in "legally exported merchandise". In light of such practices it is also argued in the second section of this chapter that the geographies of interconnection also form the infrastructure of smuggling: those nodes where forms of adjustment or switching occur such as container ports, ferry terminals or airports can become tactical sites of infiltration for the smuggling activities of organised crime gangs. Central to such forms of "criminal logistics" (SOCA, 2009/10:2) are both the interconnectedness of these supply chains, but also the parasitic harnessing of the stability of the organisational forces required to facilitate such interconnectivity. This I discuss through the notion of tactical-logistical knowledge, arguing the attempts to infiltrate the distributive space of capitalism are acts of tactical harnessing, and that the spaces of distributive adjustment are themselves sites of political struggle.¹⁰⁷ In similar terms we will also see how the system of containerisation, premised on a logic of standardisation, efficiency and contained contiguity holds within itself the mechanisms for its undoing, highlighted by Hawkins' (no date a:1) observations that smugglers are aware of the limited security procedures in place to identify whether or not containers have been broken into. This I call a systemic aporia, or an immanent disorderly force.

It is argued, along similar lines to the sites of adjustment, that the container's embeddedness in the system of containerisation and the wider supply chain apparatus affords it a significant status as a critical networked actor. We cannot separate the tactics of smuggling-logistics, nor the trajectories of objects, from the role that objects themselves play in the networked constitution of contemporary organised crime, including smuggling (Hall, 2010b:11). So, whilst there are multiple sites of smuggling,

¹⁰⁷ Although the discussion of tactical-logistical knowledge is framed around smuggling practices, a similar *modus operandi* is evident in warfare, notably through 'insurgent logistics' (see Vlasak, 2007).

given the focus of this study the shipping container serves to exemplify the wider relationship between visibility, invisibility, infrastructural flows and parasitic harnessing. I further this by designating the shipping container a 'smuggler object', that is, an object which is 'open' to smuggling practices by dint of its mobility, coupled with its capacity for modification or concealment within its physical space, and crucially its accepted place within the mobilities assemblage. On this latter point a key argument is returned to, that of the relationship between visibility and invisibility. Noted previously, the embeddedness of the container within containerisation affords it a black-boxed status whereby its taken-for-grantedness is a necessary facet of its mobility. I attempt to develop the case that invisibility itself is parasited through tactical forms of infiltrating containers, most notably by attempts to disguise how they are broken into. The chapter closes with a final discussion concerning the potentiality or 'openness' of the smuggler-object to surreptitious practices, and considers how the wilful alteration of such objects points to an underexplored avenue of social theory, where the usurpation of functionality and use through illegality may foster greater appreciation of the complexity of contemporary notions of what constitutes the politics of the object within a broader milieu.

The Theory of the Parasite:

When we consider forms of wilful illegality in relation to social systems there is a conscious choice to disrupt, or interrupt the normal functioning of these systems. But equally such acts of disruption exhibit a form of dependency, in that the gains from illegality require the existence of the system itself. It could be suggested that illegality *parasites* legality, feeding off its productive functioning. However dependency does not necessarily imply illegality or wrongdoing, for as Lewis Mumford (1971) has described, technology can also display aspects of dependency. Technology offers ease, whereby the “gift of an effortless life” (Mumford, 1971:338) is offered in return for the acceptance of the very conditions of dependency. For Mumford such a culture of dependency is based on a form of *parasitism*, where the idea of ‘feeding off’ others is a microcosm of technologically determined consumer capitalism: a lifestyle of alienated passivity fed by ever-increasing reliance on the promises of consumer culture (also see Adorno & Horkheimer, 1992:139).¹⁰⁸ The over-dependency of the individual on consumer capital is claimed to rob one of self-sustaining identity creation, that is, a “free-moving, self-reliant, autonomous existence” (Mumford, 1971:338). Mumford draws a distinction between such forms of passivity and reliance seen in consumer capital and active participation in the production of the social and cultural realm. At the cultural level the ritualised patterns of game play and education, for example, are determined by the effort of engagement and a determined will to produce (Mumford, 1971:339). Much of this argument emanates from a form of transcendent attainment—for Mumford human will is built upon forms of effort, achievement and emotional (as well as intellectual) gain. Rather tellingly these are most clearly demonstrated by extremes: it is at

¹⁰⁸ It is possible to counter Mumford’s notion of passivity by suggesting that the social parasite – one who is dependent on the megatechnics of the mid-twentieth century for example – is *active* in their dependency i.e., even though they become attuned to the promise of technological-driven ease this is acted out through conscious choice to remain ‘passive’. Mumford’s distaste at passivity and dependency leads him to criticise the very concept of the welfare state, perhaps unsurprising given his predilection for transcendent individualism.

“the edge of a desert, or along the flooding banks of rivers, in seemingly defective, insufficient, or half-hostile environments, that the spirit of man soared highest above its animal limitations, achieving not only equilibrium and growth but the ultimate—if rare—attribute of human personality: transcendence” (Mumford, 1971:340).

By contrast, he insists the unwillingness to exert autonomy of human effort leads to a situation where human attainment wanes.

His description of the parasite is clearly based upon the common representation of the social parasite as a negative construct, with its implications of an over-reliance on others and an unwillingness to exert one’s own effort. The social parasite is a translation from the biological parasite’s dependency on a host, most notably with the pathogenic parasite, which exploits or feeds off the host. This parasitic relationship is asymmetrical, where the parasite gains from the host. But there is an interesting adjunct to this, in that the relationship—whilst not beneficial to the host in this case—is indeed symbiotic. There is a “physically intimate association” between the parasite as ‘guest’ and the host (Lewis, Campbell & Sukhdeo, 2002:338). We could say they are inevitably *in relation*, albeit with the parasite dependent on the host. However, as Lewis et al go on to state: “Parasites are adapted to exploiting the free-living environments associated with their hosts, but hosts are patchy and ephemeral resources” (Lewis, Campbell & Sukhdeo 2002:338). The symbiotic adhesion is a temporary one, as the parasite requires constant replenishment. In order to find new hosts the parasite searches out new host-relations. Given the complexity of nature, the social semiotics of parasitic relations are challenged by forms of guest/host association that are not solely based on a negative notion of dependency. Symbionts, for example, are parasites that provide a mutually beneficial service to the host, whilst commensal parasites are neutral, in terms of dependency (Zaman, 2005:91). Such examples of neutral or beneficial natural parasites suggest that the representation of the social parasite should not be solely premised on the negative.

It is, however, clear that the socio-cultural connotations hold sway in the popular mind-set. Whilst one has to be observant of the historical moment of his arguments, Mumford's work identifies the centrality of perceived effort and dependency at the root of consumer capital's culture of dependency. However, his critique of capitalism via the negative notion of parasitic dependency does not fully articulate the complex interplay of the relations that constitute the spatio-temporality of contemporary capitalist forms. He appears to presume that the identity and function of the host and parasite are fixed in the seeming passivity of dependency. The implication being that the relation is one-way. Whilst some recent work has dealt with the parasite through a variety of prisms (Beisel, 2010), Serres' (2007) work on the parasite realigns such arguments in favour of a more multifaceted appreciation of the constitution of capital, human and non-human relations (also see Gabrys, 2009; Lezaun, 2011; Michael, 2000:28). Serres demonstrates how the parasite is not solely negative or passive, rather it produces greater forms of complexity. This reading of the parasite differs most markedly from the likes of Mumford on this point: it does not imply passive dependency, instead it signals the inherently *interdependent* nature of all relations.

Originally published in French in 1980, Serres' book *The Parasite* (2007) represents a notable shift away from the biological foundations of parasitism by addressing the parasite through a multi-disciplinary prism including the economic, anthropological, cultural, geographical, as well as biological. In definitional terms Serres builds a trivalent conceptualisation, employing three forms of parasitic relation: the already acknowledged biological parasite, the social parasite, and that of noise or interference. As Wolfe suggests (2007:xiii) this third manifestation is perhaps the least obvious for a non-French audience and it is the one that most notably pervades *The Parasite*. Utilising the dual meaning of the word 'noise' in French enables Serres to construct a double reading of

noise – on the one hand the more regular understanding of auditory noise, and thus the relationship with information theory’s emphasis on noise-as-interference, but also with the archaic meaning of noise in French as that which refers to “kick up a fuss” or to “look for a fight”: suggestive of uproar, turmoil, or disorder (Serres, 1995b:12). More readily identified with the classic notion of the parasite is the host/guest relation seen in the biological incarnation, where the guest relies upon the productive existence of the host. Like the biological parasite, the social parasite is the person who does not pay appropriately for the services they receive, the one who is dependent on a one-way system of dependency. These three manifestations of the parasite are principally connected through the overarching issue of the book: that of *relationality*. As we have seen in *Interlude II* the relational is an active constituency of change. It is change itself. It is at the juncture of the relational that Serres locates the parasite, and hence why it plays such a large part in the book. For Serres the very meaning of the parasite comes from the prefix *para-*: “it is on the side, next to, shifted; it is not on the thing, but on its relation” (Serres, 2007:38). In the context of noise or interference within a system, to interrupt or curtail relations between a sender of a message and the receiver is to come between: it is to be *on* the relation. Similarly, the dependency of the guest on the host within the biological model is structured through direct, bodily contact. Serres emphasises this by noting how the parasite has a semi-permanent relationship with the host. In social terms, the system of exchange created to pay in-kind for services rendered represents a further form of relation between giver and receiver, but one where there is perceivable asymmetry.

To develop each of these further let us consider Serres’ retelling (or parasiting?) of La Fontaine’s ‘The Town Rat and the Country Rat’. *The Parasite* begins with an approach that has become a trademark of Serres’ later style, a collage of the fabular, scientific and philosophical (Martin, 2009). The reader is introduced to a scene where a

town rat invites his country rat friend to feast on the scraps of food left over by the owner of the house where the town rat resides. Serres then discusses how the two rats are disturbed by a sound at the door, a *noise* that disrupts their feast of scraps. The importance of this short fable is profound. Serres propels his entire thesis of the parasite from this seemingly inconsequential narrative. He asks: which is the parasite in this tale? Perhaps most obviously one would suggest the town rat, living in the house and feasting on the food laid out by the owner of the house. Similarly, the country rat is a guest of the town rat, taking that which he did not produce. However, the owner of the house is a ‘tax farmer’, one who produces nothing, taking the profits of those who produce. He is parasitic (Brown, 2002:15). As the tale proceeds the feasting rats are interrupted by the sound of noise at the door, possibly that of the tax farmer re-entering. All of these actors are parasites; “they all interrupt” (Serres, 2007:3). In typically Serresian fashion this tale enacts a complex set of relations: whilst the rats may appear to be the ‘guests’ of the tax farmer, feeding off him without giving anything in return, if we shift perspective then the tax farmer can be seen to feed off those he himself exploits. Coexisting within the same system is the third meaning of the parasite, the noise of the farmer that interrupts the rats. In this guise the tax farmer is again the parasite. So, “the host counter-parasites his guests, not by taking away his food from them (first meaning) but by making noise (second meaning)” (Serres, 2007:52). Here Serres overturns the assumed hierarchy of relations between guest and host, doing so by introducing the interruptive potential of parasitic noise.

Although the notion of interruptive potential may seem paradoxical, the dynamic qualities of parasitic relations demonstrate how social interactions are relational forces. In the context of the origins of productive force as the signifier of legitimacy, the various characters in this fable are described by Serres as participants in a parasitic ‘cascade’. Looking to Figure 32 we can see how his diagrammatic rendering of the various parasites

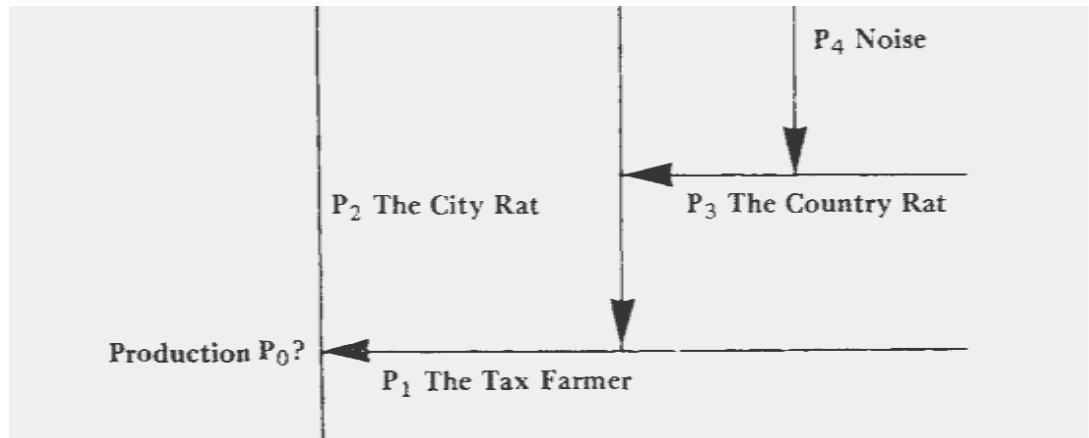


Figure 32: Parasitic ‘cascade’ (Source: Serres, 2007:4)

situates them within an apparently descending hierarchy. Parasitic noise at position 4 interrupting the meal of the country rat and town rat; the country rat at position 3 seemingly dependent on the town rat at position 2, whilst both parasite the meal of the farmer at position 1. However, as the arrows direct the viewer further down the cascade we reach position 0, eliciting the question as to where the original moment of production begins? As Mumford’s critique suggests, the question of dependency is central to social parasitism, with forms of passivity demonstrated by the seeming reliance on the productive authenticity of the host ‘giving’ to the parasite. Serres’ diagrammatic cascade proposes something counter to this. In the one-way descent—following the arrows—we appear to find ourselves at the original moment of production. However, the question mark is a telling indicator of the problematic. Where does production lie? Who is the original producer? We have seen how the tax farmer cannot be located at this position, as a standard reading of the fable might imply. However, whilst clearly the case in many circumstances, Serres’ work points to the difficulty of delineating the conceptual basis of the legitimacy of the host as the original, authentic producer. This problematic is raised by Serres in the context of agriculture, where he asks the question as to how crops are grown. It is argued that a cleared space, a *tabula rasa*, is required, “a space where nothing grows, which is tilled and ready for planting” (Brown, 2004). Only by creating a form of

separation is this possible, whereby weeds are positioned as outside the system, extraneous to the productive functioning of growing crops (Serres, 2007:177). Inside the system, the space of production is constructed and constituted. But immediately this seeming downward cascade is challenged. For the separation of space for agriculture is itself parasitic; it requires the land on which to produce. This is illustrated—again diagrammatically—by Serres when he redraws the parasitic relations in the cascade (see Figure 33). The arrow no longer remains at the supposed point of originary production at position 0, instead it curves back to return to the position of the parasite at position 4, suggesting a critique of productive origins.

If we cannot discern—with certainty—the original moment or space of production then the difference between host and parasite is likewise problematised. What, or who is the parasite? The rats, or the tax farmer? Are they coexistent? Following this logic, can the parasite itself be read as productive? Akin to the productive presence of symbionts, Serres offers us a solution to this question through his third reading of the parasite: the productive presence of noise. How can noise be deemed *productive*? Serres' use of noise as a form of interference emanates from his reading of classic information theory, a system of exchange which consists of a communicative relation between sender and receiver that is mediated by the presence of a third element, that of the message itself. It is assumed that clarity is the most efficacious aspect to communication.¹⁰⁹ A clear, pure signal can be said to offer the potential for discursive quality. The noise of static, of interference or interruption would typically be viewed as a disruptive presence (Coyne, 2010:xxi). Commenting on the logic of parasitic noise Brown (2002:7; 2004) situates the remit of pure communication within the rubric of corporate culture: clear communication boosts performance. Anything other than clear communication is

¹⁰⁹ Pervading much of *The Parasite* is the metaphorical 'tone' of the difference between noise and silence, with the latter implying an ordered, stable set of relations, as discussed in *Interlude I* (also see Goodman, 2010).

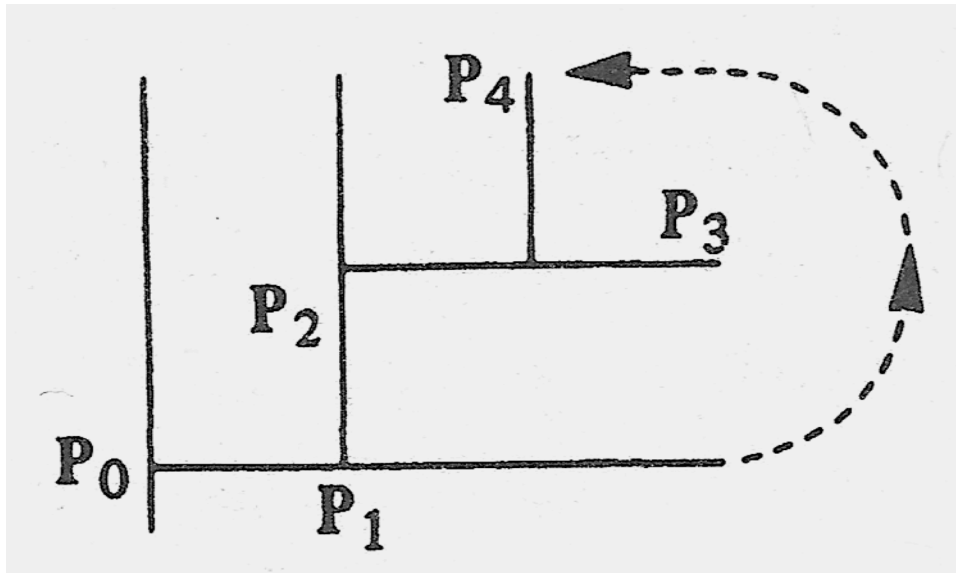


Figure 33: Parasitic 'cascade' (Source: Serres, 2007:51)

disorderly. Just as Serres states that stable systems are idealisations (Serres, 2007:72), it is evident that a pure form of communication is only an ideal state. Instead Brown advocates “a framework where the vagaries of what occurs between speakers, as messages become diffused, subjected to interference, scrambled and translated, become the source of the rich texture of social relations” (Brown, 2004). Further to this, Shannon & Weaver’s (Fiske, 1993:39) famous work locates communication within the relationship between signal and noise: “the point of maximum informational value is located somewhere between” (Brown, 2004; also see Serres, 2007:63). The location of the maximal value of information between these two extremes appears to structure another tripartite logic: that is, present within a space of communication between the sender and receiver is noise (see Figure 34). However, this parasitic noise—the tax farmer interrupting the rats’ feast—is not an “extraneous background” (Wolfe, 2007:xiii). Rather as both Serres and Hayles (1988) iterate, the presence of noise is central to the functioning of all systems. The signal is generated in part by noise; this provides a form of contrast, a ground or a context to communication. Noise however is more than simply a presence in the make up of communicative space, it is its very essence – “it is always

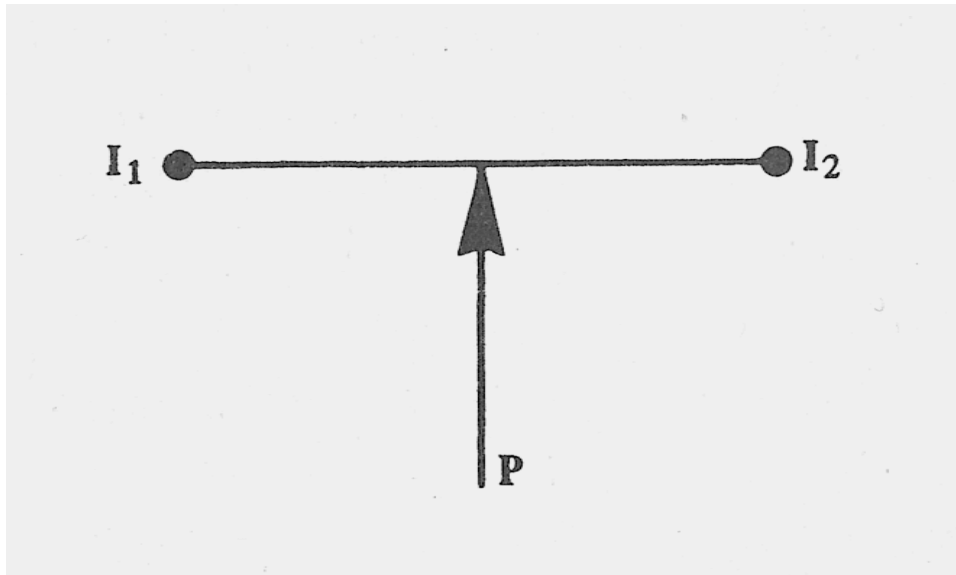


Figure 34: Sender and receiver (Source: Serres, 2007:53)

there” (Brown, 2004). Serres goes further still by arguing that, “in order to succeed, the dialogue needs an excluded third” (Serres, 2007:57), that of noise.¹¹⁰ Noise instantiates the move from a rudimentary system to one of greater complexity. As with turbulence theory, “it produces, by way of disorder, a more complex order” (Harari & Bell, 1982:xxvii). We saw, in relation to the critique of productive origins, that the Serresian parasite is not a simple beast, it produces greater complexity, greater ambiguity in the constitution of social relations. And the notion of noise or interruption as a productive relation appears to be even more striking than the critique of guest/host relations. Perhaps the ‘controversial’ nature of parasitic noise stems from the ingrained assumptions concerning the sanctity of clarity; of certainty; of controlled relations. To the speaker or sender noise appears seemingly problematic as it disguises the intended message or signal. However, an alternative point of observation, that of the receiver for example, may perceive noise in more productive terms (also see Brown, 2002; 2004;

¹¹⁰ In being united against noise a paradoxical benefit emerges – through the exclusion of noise the message is made intelligible and “assures transmission” (Harari & Bell, 1982:xxvi). Hence why the excluded third is deemed central to the functioning of any system. In this sense one could argue that by allying themselves against noise, by collectively attempting to expurgate noise, a form of positive bond is created.

2005:222; Hayles, 1988). Following the work of Atlan (1974), rather than obscuring the message, the communicative effects of mispronunciation, or slips of the tongue may well offer new insights and new forms of production. Once again, we can discern how complexity is produced through such slippages and various modes of interpretation.

Even more fundamentally for Serres is how the shift in perspective from sender to receiver confounds the very status of relations themselves. No longer is the sanctity of one relation over another a viable ideological position. Instead, through this a key element of the book is revealed: the problematic of differentiation, where the boundaries between guest/host, and order/disorder are challenged. Serres' argument is that each is present within the other; they are coexistent (see Lezaun, 2010). The outside cannot be separated from the inside and vice versa (Serres, 2007:195). Such a circumstance suggests that the exclusion of disorder in favour of order is simplistic to say the least, and likewise to assume an unfettered, unbounded notion of disorder is naïve. The question of differentiation is also a question of position. "A change of position for the observer" (Serres, 2007:66) will have a fundamental bearing on how one reads the relation (also see Urry, 2003:7). He goes on to offer the reader a valuable exposition of this:

"At the feast everyone is talking. At the door of the room there is a ringing noise, the telephone. Communication cuts conversation, the noise interrupting the messages. As soon as I start to talk with this new interlocutor, the sounds of the banquet become noise for the new "us." *The system has shifted*. If I approach the table, the noise slowly becomes conversation. In the system, noise and message exchange roles according to the position of the observer and the action of the actor, but they are transformed into one another as well as a function of time and of the system. They make order or disorder" (Serres, 2007:66, my emphasis).

This is decisive. Communication is noise; noise communication. Through the introduction of 'noise' into the system in the form of the telephone ringing, the initial operation of the system is transformed—the meal is interrupted. For the person speaking on the telephone the continuing conversation around the meal table is also interruptive. This apparently simple tale illustrates the problematic of assuming the legitimacy of one

system over another. It is incorrect to ascribe authority, even based on the apparent hierarchy of the temporal cascade. This is a question of equivalency and oscillation. Following the instructive lessons from information theory, Serres critiques the traditional conception of parasitic noise “as nesting on the flow of relation” (Serres, 2007:53), and goes onto suggest that rather than interrupting the supposedly legitimate channel of communication from sender to receiver (see Figure 34), there is an equivalency of relation. Given that, firstly, noise is inherent to the system, and, secondly, that the condition of noise is dependent on the point of observation, then the channels of relation themselves cannot be verified according to the assumed status of legitimacy. If we look to Figure 35 we can discern how Serres declassifies the sanctity of relations between the two interlocutors with the parasite intercepting the relation, and, alternatively, makes the parasite relations equivalent to the previously legitimised channel. Each has the same value: “in other words, any given position in the ternary model is, *ad libitum*, parasitic” (Serres, 2007:55).

There is also the issue of the system shifting. We saw in the example above how the system shifted when noise was perceived from a different position – it meant static to the dinner guests, but a message to the person on the telephone. There was an oscillation or fluctuation of the system, either as previously discussed where the host changes function, or in this case where the status of noise alters the operation of relations. This clearly suggests the dissolution of assumed hierarchies of relation. The purported structure of the parasitic chain is no longer constituted by the host and parasite, but rather the make up of the chain is unstable, and constantly fluctuating. To argue such is not to posit a complete loss of equilibrium or order, but to admit the transformative becomings of all systems: “the bit of noise, the small random element, transforms one system or one order into another” (Serres, 2007:21). Above all then we can garner from this how Serres’ “theory of transformations” (2007:191) offers a profound insight into

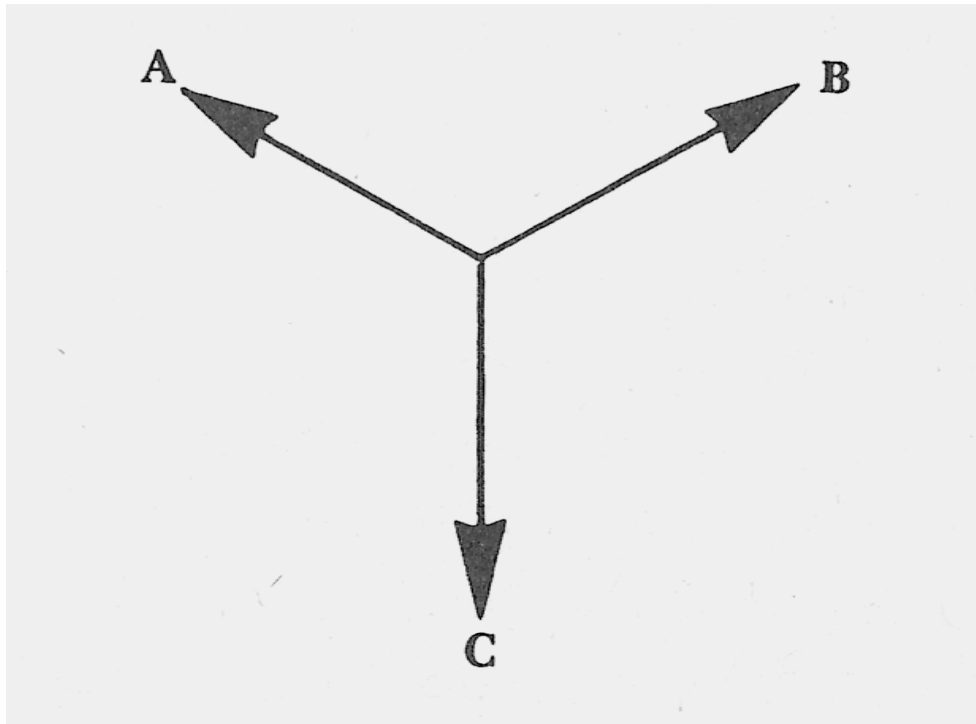


Figure 35: Equivalency of relation (Source: Serres, 2007:53)

the processual nature of relations and systems more widely. Spaces of transformation are opened up, where even the smallest, imperceptible interruption can change the state of systemic relations. And for Serres the transformative condition is the very force of production, of life itself: “as soon as the world came into being, its transformation began. The system in itself is a space of transformation. There are only *metabolos*. What we take as an equilibrium is only a slowing down of metabolic processes” (Serres, 2007:72 emphasis in original). In this guise the interference of parasitic noise is not *dis*-equilibrium as such, rather it exemplifies that equilibrium or stability are only moments in the unfolding process of life i.e., they are change in themselves. The implication of this ontology of change is not uncertainty, or indeterminacy. For to imply this would be to fall into the same trap of assuming permanent equilibrium: we need to foster an understanding that they are once again immanent to one another (Anker, 2009:86).

Taken as a whole, Serres argues that we need to look again at these questions of relation and appreciate the valuable insights that the actions, the noise, of the parasite

offer. Is the interruption of a system not part of the system itself? The nocturnal actions of the rats; their parasitic foraging defines the system. “The battle against rats is already lost” Serres writes, “there is no house, ship, or palace that does not have its share. There is no system without parasites” (Serres, 2007:12). The assemblage of relations that the multivalent system embodies emphasises the spirit of Serres’ approach: it is unfeasible to construct or maintain a system without these parasitic presences, for “they are, as the saying goes, always already there” (Serres, 2007:12). The desire to eradicate such interferences is part of an ideology of cleanliness, where the dirt is washed out (see Douglas, 2007). But where does this dirt go? It is not eradicated from the system but is part of its very constitution: “Thus a system has interesting relations according to what is deemed to be its faults or depreciations [...] Difference is part of the thing itself, and perhaps it even produces the thing. Maybe the radical origins of things is really that difference” (Serres, 2007:13).

Smuggling Logistics and the Smuggler-Object:

“Their [smuggler’s] tricks of the trade, their ruses and subterfuges are developed hand-in-hand with the development of the borders meant to control them” (McMurray, 2001:127)

How then do such forms of radical difference, embodied in the interrelations between fabular characters, help us to discern the contemporary geopolitics of supply chain securities, people smuggling and the logistical networks of contraband distribution? This section sets out to build on the conceptual armature of the Serresian parasite and argue that his critique of legitimacy; the notion of interruption as an immanent presence in all systems; and the shift in point of observation from noise to communication, all foster a profoundly more complex rendering of logistical networks as constituted by competing forces of interconnection.

On Tuesday 4 December 2001 thirteen Kurds were ushered into a supposedly sealed shipping container at the Port of Zeebrugge in Belgium by a people smuggling gang. Having made their way through Europe via different routes the group had each paid approximately £5,000 to travel onto the United Kingdom. Kelso (2001:6) observes that these gangs “promise the credulous that they can beat the defences, at a price”. Nine of the thirteen Kurds were to die through suffocation. In light of the discussions in *Part One* of the thesis it is rather telling that Kelso describes how the *inefficiencies* of the distribution system led to a series of fatal errors whereby the journey from Zeebrugge to Port of Dover that was scheduled to take eight hours actually took five days. The container in which the group was stowed was incorrectly picked from the container stacks at Zeebrugge and was loaded onto a ship bound for the Port of Waterford in Ireland instead of Dover (Kelso, 2001:6). On arrival at Waterford the automated stack system in operation (similar to the one in place at London Thamesport discussed in *Chapter One*),

with its lack of manpower present on the dockside, meant that the cries for help remained unheard. There was a further systemic failure: the container in which the group was stowed was scheduled to be loaded onto a lorry, but once more the wrong container was loaded. It was only on Saturday 8 December, some five days later, that the group were eventually discovered having been heard banging for help by the correct lorry driver.

Such systemic inefficiencies have resulted in similar incidents including a situation in June 2000 where the bodies of 58 Chinese citizens were discovered in a lorry at the Port of Dover in the UK. It appeared that the deaths were as a result of the refrigeration equipment being switched off and the doors locked shut (Hoge, 2000). Almost identical to this story were the deaths in a shipping container, due to a lack of ventilation, of 54 Burmese undocumented migrants seeking economic security in Thailand. The bodies were discovered after the driver of the truck stopped when the migrants banged on the container to alert him to the extreme conditions. As Mackinnon notes, the macabre story illustrates “the plight of Burmese migrants fleeing conflict and economic collapse in their homeland” (Mackinnon, 2008:16). These stark illustrations foreground the complex and competing forces that produce such turmoil. For it is clear that these people seeking safety in the UK or the Thai mainland could only do so by paying out large sums of money to the smuggling gangs, but concomitantly such parallel networks of criminality operate due to the increases in border security. Väyrynen raises a key issue in terms of this contradictory logic: illegal migration’s

“distinguishing feature is the legal status that is defined by the rules adopted by national governments and intergovernmental organizations. The illicit status of migrants also has consequences for the mechanisms of cross-border movement and the personal position of migrants. In other words, illegal migration cannot be separated either from the larger dynamics of the global economy nor the policies pursued by governments” (Väyrynen, 2003:3).

Although these are a selection of incidents across temporally and geographically distinct contexts, such infiltrative practices—as real-life manifestations of Bejenaru’s guidebook—speak of the methods of surreptitious passage that desperation necessitates. Instead of the comforts afforded to those individuals deemed ‘appropriate’ to travel, these acts of desperate mobility take place without the necessary sanitation and comfort requirements: without light, without rights (Martin, 2011). Due to the various forms of migration necessitated by economic or political uncertainty, the chance of birthplace or, more starkly, the increases in human trafficking and forced migration (Castles, 2003:15; Kumin, 2000), the circumvention of traditional modes of travel in environments of extreme physical and psychological deprivation are often the only means to reach safety, or indeed a life of further precariousness. Both the networks of commodity mobility and the ‘vehicles’ are the entrance points for the performance of desperate, precarious mobilities: modes of passage that lie outside the normative conditions for travel.

Undocumented migrants are often smuggled through already established networks of tourist and commodity mobility, including shipping containers, inside freight lorries and on their undersides. Such practices are premised on awareness of both the potential modes of transit, be they aircraft, lorry, or shipping container, specific infrastructures such as points of exit and entry at ferry terminals, as well as the transit routes themselves (Courau, 2003). Ships are also a common method of concealment, including the use of the ship’s rudder trunk, an area where the shaft of the rudder connects with the body of the ship. Such an area, which is used by both stowaways and for drug smuggling, provides ‘sufficient’ room (some one and a half metres wide by two and a half metres tall) for concealment (Cf. Cresswell, 2001:31-32). It is noted that these areas—deemed a “smugglers’ cave”—are accessed whilst ships are at ballast in port (No Author, 2010:2; also see No Author, 2005:3).

Whilst it is manifestly clear that practices of people smuggling and human trafficking are of an entirely different order than other forms of non-corporeal smuggling, such tactical forms of smuggling do exhibit shared approaches to “criminal logistics” (SOCA, 2009/10:2). In the case of narcotics and tobacco smuggling, distribution can take place through complex supply lines, including scheduled air routes (especially low-cost operators), ‘general aviation’ (i.e., small scale commercial flights on local airstrips), commercial vehicles such as roll-on roll-off lorries, private vehicles, foot passengers on ferries, small scale sea vessels, international rail traffic, as well as postal and courier networks (see SOCA, 2009/10:17-19). Given the present context however, the smuggling of illegal narcotics in containers, or tobacco in hidden floors built into containers, is the key tactical site for consideration (Nordstrom, 2007:129). This particular method of adapting the container, and that of smuggling tobacco as part of the load groupage (i.e., the mixed cargo in a container), has resulted in an estimated 52 million cigarettes being smuggled in via London Thamesport in 2006/7 alone (Ashton, 2007). More recently still, in January 2012 at Port of Tilbury UK Border Agency officers intercepted nearly two tonnes of cannabis smuggled into the UK from Cuba in a shipping container “carrying a legitimate cargo of molasses” (UK Border Agency, 2012). In this situation officers “found the drugs in 53 individual synthetic sacks on top of a tank carrying the molasses. It is not unusual for smugglers to hi-jack perfectly innocent shipments in the hope they will evade detection” (UK Border Agency, 2012). Particularly in the context of cigarette smuggling, the Serious Organised Crime Agency has noted that “containerised freight is the main method used in the importation of [illegal] cigarettes” (SOCA, 2009/10:18; also see HM Treasury/HM Revenue & Customs, 2006:13; ASH, 2010:2).

To be sure, the trade in illegal and counterfeit tobacco has become so large that the United Kingdom’s HM Revenue & Customs (HMRC) has developed a strategy to tackle

the distribution of such items. Since 2000 these strategies have included attempts to disrupt the supply chains of tobacco smuggling through increasing front line staff, as well as the “deployment of a national network of scanners to detect high volume smuggling in freight containers” (HM Treasury/HM Revenue & Customs, 2006:8). At London Thamesport these scanners have been instrumental in detecting smuggled cigarettes, resulting, for example, in the discovery of 3-4 million cigarettes during one investigation (Ashton, 2007). In this case the welding of a false floor provided a cavity in which the cigarettes were smuggled, without its outward appearance being perceptibly altered. Although this action was intercepted, it is clear that containers provide a fitting space for screening out such activities. In this scenario potentially suspicious containers are requested by Customs officers at the port, and it is the job of the port services to run the containers through the scanning machines. According to the logistics manager at London Thamesport:

“The boom [of the scanner] comes out and it will go across the top of the container. What it will do then, is slowly drive down the rack of containers. It takes about four minutes to x-ray a container and about 15 minutes for the images to be produced. But from that, once the computer’s created an image, it gives them a near-3D perspective” (Ashton, 2007).¹¹¹

Although these security practices do result in the discovery of illicit goods, it is rather telling that the time taken to pull containers out of the stacks, as well as carry out the scanning process, is disruptive to the accelerated flows of commodities in the pipeline (Policy Research Corporation, 2009:45). For Nordstrom there is a definite trade-off between security and commodity flows, indeed she goes as far as stating that “movement is primary, borders are secondary” (Nordstrom, 2007:116). This argument stands in contradistinction to the public pronouncements of organisations such as the IMO and strategies such as CSI and ISPS, as discussed in *Chapter Two*. Also outlined in that chapter

¹¹¹ The Container Security Initiative also identifies the importance of such Non-Intrusive Inspections (NII) to container and supply chain security (Office of Policy and Planning and Office of International Affairs, Container Security Division, 2006:18).

was the issue of chokepoints: areas of congestion in the networked flows of global supply chains. Just as schemes like the EU Motorways of the Sea are attempts to overcome the chokepoints of land-based motorway networks, so the overburden of security impediments to the materials flows of commodities represents a significant point of tension: between the security of these commodity flows and their possible deceleration, but more significantly here, how the perceivable lack of security, which is said to be inherent to accelerated commodity flows, results in the potential threat of ‘variation’ (Cf. Goldsby & Martichenko, 2005).

Entanglements of Legitimacy and Illegitimacy:

Before we consider the parasitic harnessing of extant mobilities and the resultant relationship between logistics supply chains and the tactical nature of ‘smuggling logistics’, the theory of the parasite offers a useful vantage point from which to address the wider notion of entanglement. As we saw with infrastructure in *Chapter Two* it is often invisible systems that become naturalised to the extent that they are taken as *a priori* fact. The parasitic chain of relations begins to destabilise the assumed primacy of one relation over another, most clearly demonstrated in Serres’ work through the figure of the tax farmer. A similar line of reasoning is present in terms of smuggling. At first this appears rather unfeasible, especially in light of the extremely harmful implications of people smuggling and human trafficking, added to the physical and social affects of narcotics smuggling and its attendant culture of criminality, as well as the lost revenues from tobacco smuggling.¹¹² But just as the Serresian critique of the point of observation challenges the assumed separation of noise and signal, the separation between legal and illegal trade is not as straightforward as one may assume. There are “tangled interconnections” (Bhattacharyya, 2005:1) between legal and illegal trade, where, for

¹¹² HM Revenue & Customs estimates that the smuggling of tobacco results in annual lost revenue of £2.9bn (HM Treasury/HM Revenue & Customs, 2006:6).

instance, the techniques and practices of the legal arms trade mirror those of the illegal trade in narcotics. Gill (2006:281) goes further still in noting the symbiotic relationship between legal and illegal institutions, identifying the “extensive illegal behaviour of organizations that are formally legal”.

Transnational undocumented migration is one of the most contested aspects of global mobilities, often rendered as the dark side or ‘underbelly’ of globalisation (Bhattacharyya, 2005:31-60). An important facet in the debates throughout this thesis have been the intertwined logics of interconnection and securitisation, but also the interaction between differing capacities of the mobilities assemblage, in this case legitimated and illegitimated. Bhattacharyya’s work in particular identifies the skewed ideological premise of claims surrounding the illegality of undocumented migration. She emphasises how the impulse toward unfettered trade flows masks the concomitant reassertion of sovereign boundaries:

“A central inconsistency in the celebration of economic liberalisation has been the attitude to migration. While all other forms of free movement have been championed, the free movement of people is hampered at every turn, often by those most vocal about the importance of dismantling barriers to trade” (Bhattacharyya, 2005:157).

As such the limitations on the free movement of people produce the shadow mobilities of undocumented peoples through a heightened desire to reach their destination. In relation to the constitution of contemporary capitalism Castells highlights the contradictory nature of this link between migration and capitalism: for although global capitalism promotes a culture of economic abundance, the movement of people seeking greater surety is highly securitised. As a partial result of this, he argues, we see the increased desire to migrate for economic stability and the growth in illicit practices of people smuggling (Castells, 2000:179). Similarly the policies of various western states “can actually contribute to the perception of a migration crisis because being ‘tough’ fuels new evasions such as those offered by traffickers and smugglers” (Geddes, 2005:330). It

is clear from these arguments that capitalism produces its own shadow mobilities (Bhattacharyya, 2005:32).

In similar terms to the discussions concerning people smuggling and trafficking, the smuggling of commodities has a direct and complex relationship with legitimated trade flows. Like the depiction of piracy as “a service industry, [and] a business concerned with [...] transport and distribution” (Starkey, 2001:108), smuggling too is entangled with the very constitution of trade flows, albeit non-legitimated. According to Dominguez (1975:92) smuggling is an inherently distributive practice, determined by various types of movement: from small-scale smuggling by individuals, through larger-scale operations such as weapons, to the ‘under-invoicing’ of goods declared (Nordstrom, 2007:119-120). As the latter suggests, contraband smuggling directly emerges from the imposition of import duties and taxes (Deflem & Henry-Turner, 2001:473; Karras, 2010:1). It is thus determined by flows of trade that remain *illegible* to the state, but necessarily *embedded* within statecraft. Part of the reason for such illegibility was, historically, the unwillingness of the general populace to view smuggling as necessarily illegal. Rediker, in his account of the Anglo-American maritime world of the eighteenth century, considers how attitudes toward the smuggling of contraband was given “broad public support” (Rediker, 1987:73) throughout the ports and cities of the north Atlantic, as they provided forms of economic potential. Tobacco smugglers, also in the eighteenth century, had “the support of public sympathy” (Rive, 1929:558), due in part to the common dislike of customs officers. Further to this it was argued that part of the reason for smuggling in this period was that the soldiers responsible for policing smuggling also broadly sympathised with the activity (Rive, 1929:558; Ramsay, 1952:133). Such viewpoints continue to persist in some images of smuggling as anti-hegemonic,¹¹³ or a challenge to the influence of

¹¹³ Smuggling is, for some, a necessary lifeline in the struggle against political oppression. A stark example of this in recent times is of course the Israeli blockade of Gaza, an act of logistical aggression that exemplifies the geopolitical importance of controlling supply chains (Levy,

corporate rule. Overall, it is clear that smuggling bears directly on trade, both in the obvious parasitic sense of being dependent on the exchange value of commodities, but also in the development of trade mobility itself.

In historical terms, the licit and illicit movement of commodities occurred simultaneously, where “smuggling remained central to the circulation of commodities and workers throughout the eighteenth century” (Rediker, 1987:72). Indeed the development of free trade runs parallel to the contraband smuggling of this period. It is also argued that Adam Smith, in his rampant free-market zeal, approved of smugglers as prototypical entrepreneurs (Deflem & Henry-Turner, 2001:473; also see Ramsay, 1952).¹¹⁴ In the present, forms of transgression and lawlessness populate the mobilities assemblage alongside, or in the shadow of, the legitimated movement of people and things. The global drugs trade, as described by Bhattacharya (2005), is not an autonomous entity but rather intertwined in the geographies of legal trade, both in terms of practices of smuggling and also in a wider geopolitical sense, where the deterritorialisation of impediments to the global circulation of legitimated goods and people opens an aporia in the supposed legitimacy of trade more generally: “a certain model of economic liberalisation cannot help but free illicit trade as it frees all other barriers to trade” (Bhattacharya, 2005:33). The point here is that it is impossible to disentangle the growth in sanctioned global commodities mobilities from the movement of illicit ‘things’. In the context of tobacco smuggling it has been suggested that “all of the major multinational tobacco companies have been implicated in smuggling activities and have been the subject of several legal cases to determine the extent of their involvement” (ASH, 2010:2). Crucially, the processes of illegal mobilities are “common to many other forms of trade in an unequal world” (Bhattacharya, 2005:93). In this sense it is concerned with

2010:110). Tactical smuggling through networks of underground tunnels has become necessary for Gazans to approach any semblance of ‘normal’ life.

¹¹⁴ A similar line of reasoning is pursued by Mars (1983:49) when he describes the “blurred line” between entrepreneurialism and fraudulent practices.

the organisation of movement. And as such it is not ontologically distinct from legitimated flows of goods. There is then a crucial relationship—an entanglement—between existing flows of goods and the parasitic harnessing of these extant flows, where, “hidden in the sheer volume of trade, in the economics of immediacy, in the logistics of transport, and in the contemporary revolutions in shipping lies the globalization of the illegal” (Nordstrom, 2007:158).

Tactical-Logistical Knowledge:

The points raised above imply how the intersections of legal and illegal trade flows are often hard to distinguish, highlighted most starkly perhaps by the fact that two thirds of trade moves outside legitimated flows (Nordstrom, 2007:162). We have also seen how Serres’ notion of the parasite questions the originary moment of production, or challenges the very primacy of legitimacy itself. Referring back to the debates in *Chapter Two*, the symbiotic link between military and commercial logistics also attests to this critique, through the inherent power relations of infrastructural control. In doing so we cannot forthrightly assign permanent legitimacy to one set of flows over another. The flows of licit and illicit ‘stuff’ coincide; they are literally *inside* one another, coextensively.

This needs to be developed further. As suggested by practices of securitisation, such entanglements are not simply accepted as inevitable, for there are candid attempts to buttress the façade of legitimacy and impose an exteriority to the system. More importantly still, the practices of smuggling—corporeal and non-corporeal—suggest how the harnessing of legitimated flows is an important determinant of illegal mobilities. In this sense the reading of the parasite proposed here is much closer to the apparently ‘straightforward’ reading of guest/host relations, where the parasitic act is one of—to repeat the quote—“nesting on the flow of relation” (Serres, 2007:53). This implies a parasitic form of logistical mobilisation: they suggest ‘dependency’ *on*, and penetration *of*

already extant mobilities. The scare quotes around the word dependency were intentional. For as we saw earlier in this chapter the Mumfordian description of parasitic dependency was critiqued in terms of promoting a limited notion of parasitic relations. However, the term dependency is applicable to the intercepting of relations outlined here. Where the uses of the term differ is in the context of knowledge. Just as Serres deconstructs the notion of productive origins, so the apparent epistemological stability of logistical mobilisation should also be interrogated. Parasiting the moniker of “criminal logistics” itself (SOCA, 2009/10:2), I term such practices a form of ‘smuggling logistics’. This highlights the immanent forms of *tactical-logistical* knowledge and expertise that are developed (in the case of stowaways, as a result of being excluded from legitimated flows) in order to appropriate and utilise the interconnectivity of commodity flows, albeit surreptitiously. Where the discussion of logistics in *Chapter Two* noted how a specific set of knowledge formations of the most advantageous spatial and temporal mandates were developed to provide efficient commodity flows, in this case we might consider how the selfsame infrastructural power is parasited through a further set of knowledge formations, albeit those deemed illegal.

Whilst de Certeau’s work (1984) on tactical knowledge is now an established reference for discussions of counterpoints to prevailing operations of power (see Crang, 2000), it is still an appropriate resource for investigating how power is utilised and turned against itself (see DeSilvey, 2003; Round, Williams & Rodgers, 2008). De Certeau’s differentiation between strategy and tactics can almost be read as a model for this entire study, based as it is on an investigation of how unpredictability exists “within [a] space ordered by the organizing techniques of systems” (De Certeau, 1984:34). Although de Certeau admits that strategies are historically contingent he affords them a specific sense of mastery, notably in terms of spatial delineation and control. The legibility of such managed forms of space are contrasted with “the space of a tactic”, that is “the space of

the other” (De Certeau, 1984:37). Mirroring de Certeau’s Lacanian predilections (Crang, 2000) the notion of the Other does not exclude the presence of this Other, rather it *requires* it. Central to tactical forms of practice is the continued presence of the space of strategic power, for tactics “play *on* and *with* a terrain imposed on it and organized by the law of a foreign power” (De Certeau, 1984:37 my emphasis). Tactical forms of resistance employ the means of imposition in order to re-inscribe them through different forms of expression. In effect the knowledge and practices that smuggling gangs, stowaways or contraband smugglers employ may represent an illicit form of logistical knowledge. Rather than logistics as the management and control of interconnection, this alternative form utilises the self-same geographies of interconnection for unsanctioned mobility. And as de Certeau would have it: “particular conjunctions open [cracks] in the surveillance of the proprietary powers” (1984:37). Further to this, the systemic weaknesses in the logistics supply chain are “chance offerings of the moment” (1984:37). Smuggling logistics testifies to the ontological openness of interconnection itself where the cracks are potentialities that can be seized.

Conceptually, Serres’ work on parasitic relations also embodies the notion of ‘locking-onto’, through nesting on relations or interconnections. Such nesting is present in the activities of the town and country rats as they feast on the already prepared scraps of the tax farmer’s meal. They did not prepare the meal; rather they ‘interfered’ by eating the existing scraps. In this context, locking-onto may seem a rather perplexing means of addressing this, but the intention is to highlight how the rats ‘depend’ on the already existing presence of food, rather than having to produce the meal themselves. We might say that the meal is an existing flow of information, an extant trajectory. In his essay ‘Mediators’, Deleuze (1992a) outlines an alternative to the productive force of the originary, and deals instead with the concept of ‘putting-into-orbit’. This emphasises other forms of movement beyond the authority and supposed authenticity of motive

origins (also see Anker, 2009:14-15; Deleuze, 1990:302). This is not a question of production, rather that of harnessing already existing formations or flows. Whilst framed around sporting pastimes Deleuze's contention provides a valuable elaboration of the harnessing power of the parasite. Although the parasite is not named as such, he states that:

“Many of the new sports – surfing, windsurfing, hang gliding – take a form of entry into an existing wave. There's no longer an origin as starting point, but a sort of putting-into-orbit. The basic thing is how to get taken up in the movement of a big wave, a column of rising air, to “come between” rather than to be the origin of an effort” (Deleuze, 1992a:281).

Echoing much of Serres' discussion of the parasite as the relation between other relations, the decisive aspect of Deleuze's argument concerns the situation of 'coming between', of “intercepting the relation” (Brown, 2004). The surfer, windsurfer or hang glider rides the flows of information, metaphorically 'feasting' on the existing movements of water or air. Such a form of interception is not simply disruptive. Rather than being concerned with the authoritative power of productive force, the movements suggested by putting-into-orbit reflect a conception of mobility that is premised on motive force as relationally constructed. Above all the description of insertion into already existing movement resonates with my contention that smuggling performs a similar 'taking-up' or harnessing of already extant flows.¹¹⁵

Parasitic 'Adjustment':

Whilst such discussions of tactical-logistical knowledge outline epistemological instability there is of course a more grounded approach to such questions, in this case involving the practical manifestations of such knowledge formations. Neffenger, for example, recognises (without naming them as such) that tactical-logistical knowledge formations

¹¹⁵ Further to the earlier discussion of entanglement, the apparent separation between 'good' and 'bad' flows is inherently problematic when we consider once more the legacy of infrastructural power, rooted as it is in the mobilisation of military force.

are evident, when he argues that,

“Logically, a person who wanted to move dangerous things would watch the trade system in total, and look what gets caught moving through - what gets caught, how, when, and where. And look at what gets through: the simple everyday commodities smuggled in the vast flow of trade. This, then, would probably seem a good way to move dangerous things” (Neffenger, cited in Nordstrom, 2007:202).

This suggests how appropriative tactics are derived from knowledge of the flows that ‘get through’, including the attendant security apparatuses. In effect we can see that the strategic points of efficiency as well as the gaps or cracks in security itself afford opportunity or potentiality. So, from this it is evident that the de Certeauian notion of the tactical is not solely premised on “the cracks that particular conjunctions open”, but equally the potential that efficiency produces—of ‘what gets through’. De Certeau’s rendering of strategy as the production of exteriority, is, in this guise, folded back in on itself and the efficiencies of intermodalism identified as points of parasitic potential. Here I want to consider how the sites of adjustment are significant spaces of transformation, primarily because they are the parasitic points of entry into the ‘big wave’ of commodity trajectories. We saw in *Part One* how the switch between various nodes of the logistics network and supply chain depends on the stabilisation of interconnection: the spaces of adjustment such as the logistics enclaves, distribution warehouses, lorry parks, ferry terminals, container ports, and airports (Graham & Marvin, 2001). As outlined in *Interlude I* we also saw how the mechanisms of legibility were intended to make visible the operations of institutions and individuals for the purpose of political, social and economic control by the state and state-sanctioned organisations. Conversely, the process of making-legible extends the visibility of systemic power beyond those sanctioned to be privy to such operations. The visibility of containers within port spaces and beyond is in part a result of their global ubiquity. A ubiquity that is repeated the world over, in no small part due to the standardisation of the system: hence, of course, the distributed

nature of security seen with the CSI.

With the apparent knowledge of the spaces of adjustment, the operations of these spaces, the means of infiltrating the containers, the planned schedule of sailing, and the standardised qualities of the system, the system is seemingly legible. This is evident when we look back to the brief examples outlined above. The group of Kurds smuggled into the container at the Port of Zeebrugge testify to the geopolitical significance of these ports as critical ‘fulcrums’ in the networked spaces of illegal mobilities. That this is the case is evidenced again when we look to the opening example of Bejenaru’s guidebook. Turning to Figures 29 & 30 we can see how forms of tactical knowledge are communicated through the specific buildings, facilities and points of potential infiltration being identified. Again, the security procedures in place at London Thamesport, including the pager system discussed in *Chapter One* also highlights the acknowledged potential of these spaces of adjustment for illicit mobilities. This is also verified by the securitisation of port spaces discussed in relation to the ISPS Code, notably with the “illicit observation of the [port] facility” (International Maritime Organization, 2003:78).

The combinations of tactical knowledge and the parasitic potential of repetitive, routinised networks is demonstrated in historical terms by Cresswell’s (2001:30) work on the itinerant geographies of hobos, and their harnessing of the trajectories of the standardised rail networks of 1870s America. In particular the design of the freight wagons and the routinised scheduling facilitated what Cresswell terms a “working knowledge of the hidden spaces of a train regardless of the line in question” (Cresswell, 2001:31). Key to this was the regularity of wagon design, repetitive nature of the network, regular scheduling, as well as the point of potential ‘entry into the wave’. For the hobos the mode of locking-onto these existing flows was by climbing “aboard once the train was moving, for then the train was outside the disciplinary space of the station or yard” (Cresswell, 2001:31). This latter point in particular signifies the specific geographies of

parasitic adjustment, as well as the historical presence of securitisation apparatuses. It also draws our attention to the shifts that have occurred in the intervening period, most notably in relation to the inherently more *distributed* quality of the intermodal container. So whilst the means of locking onto the existing flows of the freight wagons in the 1870s depended on the relative slowness of the trains as they had left the yard, the intermodal container extends beyond single, national transport networks, meaning that containers can be parasited at multiple points along the logistics pipeline: the goods yards; warehouses; lorry parks, etc.; which make up the global network of the spaces of adjustment. So, the geographies of interconnection that define the logistics pipeline suggest that the post-Fordist supply chains extend the potential weakness of the system by providing numerous aporetic spaces of adjustment throughout the supply chain. This underlines the fragility of systemic interconnection and adjustment: the more distributed the system the more open to vulnerability it becomes, thus highlighting the increased security requirements of the Container Security Initiative (CSI).

This aporetic spectre of routinisation is part of an extended history of Modernity's production of its own immanent instability. Scott's (1998:29-33) work on standardisation as a tool of statecraft provides an invaluable insight into the issue of vulnerability. In the context of industrial agriculture he argues that standardised monocultures were seen to offer a regular and predictable yield for farmers, and as such afforded a sense of stability in terms of our own discussions. However, the homogeneity and uniformity of the crops meant that the entire crop became prone to the same diseases. A further analogy with the issue of inherent weaknesses in uniform, standardised systems is seen with the notion of agriculture 'security':

“The modern regime of pesticide use, which has arisen over the past fifty years, must be seen as an *integral* feature of this genetic vulnerability, not as an unrelated scientific breakthrough. It is precisely because hybrids are so uniform and hence disease prone that quasi-heroic measures have to be taken to control the environment in which they are grown” (Scott, 1998:269 my emphasis).

Whilst aware of the analogical translation, there are important links with the standardised culture of uniformity in containerisation, most tellingly from this quote in relation to the symbiotic bond between open flows of commodities and securitisation.¹¹⁶ Added to this, the central thrust of his argument resonates with my own in terms of the ‘genetic’ vulnerability of systems that are based on uniform, routinised, repetitive, and standardised processes. Finally, this draws our attention to the issue of adjustment *per se*. Just as the openness of trade flows exemplified the entanglements of legitimacy and illegitimacy, so the operation of adjustment is not solely premised on a closed system. Instead, the fundamental characteristics of complex systems mean that adjustment occurs across a variety of foreseen, but equally unforeseen, registers. These are moments of localised variability. Not solely in relation to the need to stabilise the adjustments themselves, but also in terms of what is adjusted i.e., non-sanctioned peoples and things. It is relationality in all its complexity. Interconnections, adjustments, switches, relations: all are sites of change, of a movement from one phase to another. They are in process, and as such they are open to bifurcations and shifts in both meaning and function.

The (In)visible Trajectories of the Smuggler-Object:

Although the central problematic of the interplay between stability and instability has already been raised in relation to the sites of adjustment, this also becomes evident when we consider the specific issue of the trajectories of objects. It is with the specific mobility or trajectory of the shipping container (and of course the other vehicular objects within the transportation networks) that the ultimate ‘potential’ of parasitic harnessing lies, in part due to its power as a form of mobile infrastructure, and again its inherent distributedness. Critical to the ubiquity of the shipping container is, of course, its capacity

¹¹⁶ Although I state the potential problem of translation, Scott’s own work utilises a similar linkage between other grand schemes of Modernity, including Modernist planning strategies. In fact, he compares the parallel rise of “standardized routines of shipping” (Scott, 1998:266) with monoculture agriculture.

to move. By now this should be taken as a given, for we have seen how the infrastructural apparatus of containerisation affords a certain quality of invisibility to their mobility, an issue to be fully addressed in the next section. Even as the commodity flows provide a parasitic trajectory for illicit practices, there has to be a ‘vehicle’ or ‘carrier host’ to facilitate movement.¹¹⁷ This is where I situate the smuggler-object, which I define as an object that facilitates smuggling practices through its inherent mobility, alongside its capacity for alteration or concealment. The moniker of smuggler-object is also intended to exemplify the critical relationship between object geographies, tactical-logistical knowledge and, in particular, its contextual embeddedness in the mobilities assemblage.

Given this point concerning the container’s ‘taken-for-grantedness’, there are important questions concerning the notion of invisibility and its relationship with the smuggler-object *per se*. As seen in *Chapter One* part of the fundamental success of containerisation was the homogenisation of cargo through the uniformity and standardisation of the container design. However, as discussed above, the visibility of the sites of adjustment highlights the immanent fallibility of such schemes. In the present case we can further unpack the potential implications of the visibility of cargo uniformity for the smuggler-object. The use of the x-ray scanners attests to the complex relationship between invisibility and the accelerated flows of commodities, and the need to make visible the contents of containers for security purposes (HM Revenue & Customs and UK Border Agency, 2008).

To consider how these discussions on the entanglements of (in)visibility may relate to the conceptualisation of the smuggler-object it is necessary to briefly return to some of the debates surrounding the processes of stabilisation and invisibility associated with black boxing (Latour, 1987). In *Chapter One* we saw how the stability of containerisation as a system was delivered in part by standardisation and the process of

¹¹⁷ This argument follows a line of reasoning developed by de Cauter (2004), where he stresses the centrality of ‘capsules’ to the constitution of networked flows (see Martin, 2011).

delegation. Added to this, the efficiencies of containerisation revolve around the number of objects that function effectively, for if this were not the case then there would be a continual need to scrutinise each object and process. The issue of invisibility, then, is fundamental. It posits the relationship between taken-for-granted objects and their status as ubiquitous, stable and reliable intermediaries of everyday experience, and of course mobility (see Binnie et al., 2007). The sheer volume of containers traversing the logistics pipeline render individual ones seemingly invisible, ostensibly identical as they are (and have to be) to one another. As black boxes, mobile objects do not have to be ‘opened’ in order to move, rather they are expected to move, and as such may be said to remain invisible. To be sure, containers in particular are “a paragon of in/visibility” (Nordstrom, 2007:158).

The invisibility of the container as it traverses the trade routes of contemporary capitalism is at once its power, and its immanent ‘potential’ to destabilise the self-same trajectories. One way to conceive of this relationship is to focus on the notion of *appearance*. Alfred Rive, in his discussion of the history of tobacco smuggling in the seventeenth century, describes how smugglers imported Spanish tobacco into England “*under the guise* of plantation tobacco” from the English colonies (Rive, 1929:554 my emphasis). This confirms the arguments above concerning the symbiotic relationship between increased levies on the importation of commodities, and the resultant rise in smuggling. Even more crucially to the discussion here is Rive’s observation that “the customs officers could not with certainty identify tobacco as Spanish or colonial” (Rive, 1929:554). Later, in the early nineteenth century, examples existed of “the use of false bulkheads and linings in ships, hollow stones in the ballast and tobacco made to look like potatoes or rope” (Rive, 1929:568). We see how a similar process of tactical-logistical knowledge was in evidence, whereby the stones used as ballast were parasited due to their recognised status as stable entities of the system. Likewise, the element of disguise was

used to mimic the established presence of commodities such as potatoes or rope. We could call this the *politico-aesthetics of appearance*. Customs officers were unable to distinguish licit from illicit commodities due either to similarities between them, or the means of disguise or alteration of existing material spaces, such as false bulkheads.¹¹⁸ This issue is critical to the successful functioning of the smuggler-object, be it historical or contemporary: it should not attract the attention of the securitised gaze. In effect it should *convey* its taken-for-grantedness, and apparent innocence.

It is perhaps this communicative function of the smuggler-object that is most critical for the designation of the shipping container as such an object, for its utter ubiquity is parasited, as is its volumetric capacity, and its blank exterior appearance. Whilst new technologies, such as the x-ray scanners described above have been developed to aid the work of customs officials, the link between historical and contemporary modes of concealment is rather striking. Both new and old are based on the ‘material semiotics’ of the object (also see Law, 2009). The outward projection of meaning that can be ascribed to the container is dependent on its invisibility and blankness. Where the historical rationale for developing the container was partly premised on overcoming the problems of theft associated with break-bulk cargo (see House, 2005:28; McKinsey & Co., 1966:3), the discreet internal space of the container opens up another set of potential derivatives and misuses (an issue explored in more depth in the following section). So, whilst certain commodities described by Rive had to be disguised, the volumetric capacity of the shipping container, added to its blank, outward projection, means that it offers a space for concealment similar to the false bulkheads also outlined by Rive. This is not only the case with the actual space of

¹¹⁸ The covert use of spaces within ships or aircraft was such a problem for customs officials that part of the training regime of UK customs officers involved the identification of such spaces, as well as the sharing of knowledge via ‘copycat’ drawings. These were drawings made in the 1950s and 1960s by Customs officers of the particular spaces where concealment methods were used, which were then distributed to various security outposts (UK Border Agency National Museum, 2010).

concealment offered by the container's internal capacity, we also see how concealing illicit goods or stowaways amongst purportedly licit commodities is a common tactic (see BBC News, 2009; HM Treasury/HM Revenue & Customs, 2006:22; Naím, 2006:81; UK Border Agency, 2012). As is the misrepresentation of goods that are different to those listed on the Bill of Lading or Manifest (Nordstrom, 2007:119-120). In this case the apparent legitimacy of the goods in containers, proven by the Bill of Lading and customs clearance documentation (see HM Revenue & Customs, 2010), is used as a 'front' for the transport of more expensive loads, be that extra goods of the same type, or entirely different commodities (Hawkins, no date a:2).

As described earlier, the discovery of smuggled cigarettes in the false floor of a container at London Thamesport (Ashton, 2007) further demonstrates this issue of outward coding in relation to smuggled goods. Evidence of tampering is decisive in this respect, particularly the attempts on the part of smugglers to conceal evidence of interference. Unsurprisingly the tactics of infiltration primarily depend upon the security of container doors, or lack thereof. The security organisation Signum (working under the auspice of the shipping industry-sponsored UK P&I Club) has addressed this issue with regard to the operation of door seals. The doors of containers have a metal plate welded to the right-hand door, which then overlaps with the left, keeping the doors shut (see Figure 36). To further secure the locking mechanism a seal is then placed through a hole in the lock of the right hand door mechanism (see Figure 37), to indicate whether or not the container locking mechanism has been tampered with during transportation. Physically, seals take a variety of forms (see for example Figure 38), from somewhat rudimentary cable ties; metal bolt seals; preformed metal seals which unravel if cut; seals with unique barcodes; through to electronic security seal devices (see Berger & Denny,



Figure 36: Container door assembly (Source: Photo author's own)



Figure 37: Container door handle (Source: Photo author's own)



Serial number



Locking mechanism



Acme 'T' lock - underside of seal



Figure 38: Example of official UK Customs seal (Source: HM Revenue & Customs, 2011:4)

2010; Choi et al., 2010).¹¹⁹ Bar the latter, this surprisingly rudimentary system has obvious drawbacks. Firstly, not all containers have to be sealed. In the context of the UK export system seals must be used only in the export of specific commodities such as bovine meat, cigarettes and alcoholic spirits (HM Revenue & Customs, 2010:59-60; Cf. Office of Policy and Planning and Office of International Affairs, Container Security Division, 2006:18 & 36).¹²⁰ More fundamentally, in other situations the use of seals remains the choice of individual shippers, resulting in the situation—described by Nordstrom (2007:182)—where they are rarely employed.¹²¹ When they are utilised the method of inspection is often visual in nature. For example, at London Thamesport the security procedures in place to check that seals have not been tampered with, involves a straightforward visual inspection where “we just go along, check the seals, check it against our certs [certificates] and then release the container” (Ashton, 2007). In this situation it is clear just how important individual seals are to the security of containers, thus the use of unique serial numbers. Whilst visual inspections are in evidence at terminals such as London Thamesport, Hawkins raises an important observation with regard to the systemic problem of checking every container seal: unless “its door locking

¹¹⁹ RFID technology is an important addition to security seals. In particular it is claimed that active RFID seals can transmit information as to whether they have been removed, negating the need for visual inspections (see Mullen, no date; Barro-Torres et al., 2010).

¹²⁰ The situation in the United Kingdom with regard to the export of goods is governed by the use of official Customs seals, as well as the use of trader’s own seals (where they have been sanctioned by HMRC) (HM Revenue & Customs, 2011). The policy on the use of Customs and trader’s own seals emphasises the importance of using officially sanctioned seals (HM Revenue & Customs, 2011:10-11). It also provides information on how to identify Customs seals, through identification marks such as the HMRC logo. As with the commercial seals available on the market HMRC seals have unique serial numbers as well as an ‘anti-tamper identifier’. In the context of trader’s own seals it is clearly stated that the characteristics of these seals must be such that in the event of breakage or removal there is a trace of this “visible to the naked eye” (HM Revenue & Customs, 2011:8). Equally, the issue of tampering with seals or the illegal copying of them is deemed a notable factor in their design: “identification marks of seals must be impossible to falsify and difficult to reproduce [and] materials used must be resistant to accidental breakage and prevent undetectable falsification or re-use” (HM Revenue & Customs, 2011:8).

¹²¹ Nordstrom (2007:185) also notes how the numerical identification system for containers is prone to fallibility, arguing that this can be changed with ease: “A can of spray paint, some construction paper, and a pair of scissors is all it takes to change the container’s identity”. This is not only the case with attempts to wilfully change a container’s identification. As Mullen (no date:182) notes, containers often have multiple identification numbers that have been accrued over a period of time: he states that it is often difficult to ascertain which is correct.

mechanism and seals are checked at every interchange point, a tampered container is able to transverse interchange points undetected” (Hawkins, no date b:1).

Further to this, the simple notion of a visual check does not take account of the fact that the tactical infiltration of containers occurs where the seals themselves are not disturbed, thus perceivably suggesting that the container doors have not been tampered with. Hawkins (no date a:2) notes how in specific situations port terminal staff have been “unaware that a container door could be opened without interfering with the seal”. Given that a damaged seal is the main signifier denoting tampering, the two main methods of opening the right-hand door without noticeably damaging the seal are highly significant means of tactical harnessing. These include: “the removal of the rivet that retains the locking handle in the handle hub attached to each of the upright locking bars” which then “allows the handle to be lowered without damaging the seal” (Hawkins, no date b:1). After rotating the bar on the right hand door, the left hand door can then be opened. Similarly, the other method of entry, involving the handle locks, also relies upon the removal of rivets to allow the seal to remain intact. Given the issues of invisibility and the politics of outward appearance discussed so far, it is this means of disguising the evidence of tampering that proves decisive in both cases. When rivets are removed replacement ones are often just “glued back into position to disguise the fact” (Hawkins, no date a:3). In a further attempt to disguise tampering the areas which have been drilled out or cut are known to be repainted (Hawkins, no date b:1). We can appreciate how the small-scale tactics of concealment, such as repainting the areas tampered with or gluing on fake rivets, suggest how the invisibility of the container depends on its perceivably ‘innocent’ outward coding, not unlike the nineteenth century potato. If the outer appearance of the container does not suggest that it has been tampered with then the object potentially remains black-boxed or embedded within the system. Whilst small-scale in gesture such forms of tactical harnessing clearly hold significant geopolitical

importance in terms of supply chain securities (see Thrift, 2000). This is attested to by the fact that the Container Security Initiative notes the need for developing new container seal technologies (such as RFID enabled) that offer greater potential to track the global mobility of individual containers (Office of Policy and Planning and Office of International Affairs, Container Security Division, 2006:18).

The relationship between the question of (in)visibility and black boxing is a decidedly complex one: it is tempting to suggest that the use of ubiquitous mobile objects—such as the shipping container—for the purpose of smuggling is tantamount to tearing open the black box, revealing the internal working mechanisms of the system. For, as Latour has described, it is only when technical objects (or systems) breakdown or lose their efficiency that the internal aspects of the black box are revealed (Latour, 1999:182). When the object fails and the black box is torn open the inner workings come under scrutiny, each of the constituent parts are revealed as black boxes in their own right. Although this may be pushing the metaphor too far, the opening of the mundane black box through the parasitism of smuggling reveals the internal workings of the individual black boxes of the mundane objects of mobility: from the weaknesses in security procedures, through to the geopolitical significance of tin seals. However, as this section has attempted to demonstrate, the smuggler-object must remain closed and retain the outward signification of the collective black box that maintains its invisibility, and its contextual embeddedness. Equally, the ‘efficiency’ of black-boxed containerisation is not lost; rather it is parasited. In light of this it can be suggested that the Serresian parasite delineates how, on the one hand, the efficiencies of global commodity mobilities are harnessed, in this case the embedded invisible qualities, and on the other hand how this form of efficiency may be said to oscillate—between legitimated and illegitimated expressions.

The Transformative ‘Openness’ of the Smuggler-Object:

Given the discussions above on the various entanglements between stability and instability, a final debate begins to emerge: that of the ontological *instability* of the object itself. We saw in *Interlude II* how the permanent stability of the ‘object’ is profoundly destabilised by process-relational approaches. It was suggested that any attempts to forthrightly assign ontological and epistemological stability to an object must be figured against the unfolding spatio-temporality of the object-*in-relation*, as well as (in DeLanda’s terms) the capacities, as opposed to the qualities, of the object. Holding to this, what are the implications for the discussions above concerning the harnessing of the container’s black-boxed, invisible and purportedly stable qualities? In this final section I argue that we are privy to the entanglements of stability-instability through the *potentiality* that the shipping container offers. By employing the term potentiality the intention is to highlight the effective potential of objects to exceed themselves: to be part of an unfolding space of transformation, in Serresian terms.

In relation to some of the discussions in *Interlude II* on object agency, Jane Bennett’s highly instructive work on ‘thing-power’ provides an important benchmark for these debates. In particular her emphasis on “material recalcitrance” (Bennett, 2004:348) is a suggestion of the determining potential of the thing itself to affect human action and control. In wishing to “give voice to a *less specifically human* kind of materiality” (Bennett, 2004:348 emphasis in original), we are privy to the idea of a resistant material assemblage – suggesting a material liveliness that ‘acts back’, thus refusing the portentous assumptions of human agency alone. So the shipping container can at once be a vehicle of global commodity distribution, and simultaneously a space of smuggling, threaded through with agential potentiality. The recent example outlined earlier where a container full of molasses was simultaneously utilised to smuggle cannabis testifies to this (UK Border Agency, 2012). In DeLandian terms, from the perspective of its relations of

interiority, a container's operation is determined by its place within a perceived systemic, totalised whole—that of intermodal containerised transport. But if we approach it from a relation of *exteriority* the capacities of the object are *open*. It is perceivably part of one assemblage, that of container transport, but it may simultaneously be part of another assemblage, that of smuggling. The self-same object, according to DeLanda's thesis, could be detached from one assemblage and become a component part of another assemblage. Added to this, the key factor in my own argument is that the component remains in one assemblage (container transport), whilst *imperceptibly* acting in another, that of tobacco smuggling, for example. Serres' parasite again offers a useful means of highlighting this: for as we saw at the outset of this chapter a critical factor was the implications of the point of observation; of where we look from. The system oscillates. So the container does not exit one assemblage and enter another (from licit to illicit distribution) but rather acts concurrently within both, switching function according to the point of observation.

Put simply, the stability of the container is open to misuse. This statement situates the twin focal points of this final section: *openness* and *use*. There is a symbiotic relationship between an object, its capacity for openness, the types of usage afforded to the object, as well as how it is put to use. We saw how the volumetric capacity of the container, coupled with its inherent taken-for-grantedness, afforded it a further 'capacity', that of its *receptivity* to illicit mobilities.¹²² This notion of receptivity is a telling one. It suggests that the object itself is *open* to such practices. Openness in this guise is intended to reflect both an antithetical relationship to closed systems, but more concretely that the object is accommodating to new forms of utilisation, and thus is an opening *to* transformations, to "novelty and event" (Anker, 2009:9). The concept of openness proposed here is intended to reflect a temporal, material and spatial unfolding, where an

¹²² This double reading of capacity is intentional, both in the DeLandian sense of relations of exteriority, as well as the quotidian notion of spatial fecundity.

object (as well as subject) holds within it the potential to change; to become Other. As such, certitude and stability are a-temporal. Strictly speaking then, on a conceptual level it is clear that all objects, given the relational capacities discussed in *Interlude II*, are transformative in their ontological openness. As Knorr Cetina suggests, there is an “*unfolding ontology* of objects” (Knorr Cetina, 2001:182 emphasis in original). Objects, as well as social systems, are not complete in the sense that they are finished. To suggest otherwise is to deny the temporality of becoming, and limit the potential of objects to change. In light of this notion of incompleteness I want to address how the smuggler-object is perhaps more ‘practically’ open and incomplete through dint of its networked nature, its black-boxed qualities, as well as its inherent mobility. That is to say that some objects are more open and transformative than others.

To try and consider the notion of openness a further term can be introduced: that of the *unfinished* object, where they are always subject to change. Such objects can be described as undergoing “continual development so that they are no longer fixed” (Julier, 2009:96). Although in this case the developmental nature of software systems is a paradigm for such an idea, a variety of scholars have addressed the issues of the unfinished nature of objects (Harman, 2009; Knorr Cetina, 2001; Redström, 2008; Tonkinwise, 2005).¹²³ As we saw in *Chapter Three* objects produce new formations as they unfold over time, or enter into new interactions with unexpected agents, both human and nonhuman (see Calder Williams, 2011; Latour, 2005:81; Michael, 2000:42).¹²⁴ Utilising Heidegger’s concept of *phüsis* Tonkinwise notes that, “all things are in motion, especially those concrete everyday things which we moderns think are ‘at rest’” (Tonkinwise, 2005:23). Crucially for our argument here is the movement of all things, even those that

¹²³ Within the field of design studies the idea of the ‘open’ is a growing conceptual focus, including the notion of user-centred design where the object is in an unfolding relationship with the user, as opposed to the user being governed by the designed-object (Redström, 2008). Openness is also ascribed to the design process, in that the processual nature of development is embraced as opposed to being externally controlled (see Binder et al., 2011:13-16).

¹²⁴ Although at different ends of the ethical spectrum, the use of containers as residential or office spaces is clearly emblematic of the unfolding dimensions of use-value (see Slawik et al., 2010).

are perceivably still. Objects are always in a state of transformation, even though, as Tonkinwise states (2005:25), the finished state of mass-produced objects affords them a sense of remaining unchanged. Of course, the unfinished quality of an object implied by its unfolding qualities encompasses objects that do not perceivably change, as well as those that undergo a radical transformation. To reiterate my main assertion: whilst all objects are open in their unfinished unfolding there are qualitative differences in how open they are and how they unfold. In the case of the shipping container in its capacity as a smuggler-object its black-boxed quality would appear to somewhat paradoxically suggest that it is more open through its standardised design and inherent opacity. It affords a greater sense of an unfinished quality through its *relations* with a multiplicity of different actants, which themselves are unfinished. We saw this earlier with regard to the parasiting of adjustment. Given this, the unfinished quality of an object also suggests that the very notion of the object extends beyond the material bounds of its own physicality and enters into sets of relations with other unfinished objects, in the case of the smuggler-object with the smuggled goods as well as the constructed false floor of the shipping container. They form new alliances.

In this sense, if permanent epistemological and hermeneutic stability is untenable then the assumed functionality of an object is equally unsound in the sense of permanent, or more importantly, *assigned* functionality. A paradigm of the Modernist doctrine of ‘functionalism’, functionality is a central condition (or conceit) of the designed and manufactured object (and building) (Forty, 2000:174-195; Heskett, 2002). It must function well to be deemed successful. Referring to mundane objects Michael argues that they “afford a sort of generic stability and this rests on their essential functionality” (Michael, 2003:132). That is, what an object perceivably *does* for the user. Whilst later work on the symbolic economy of the object sought to question the myth of functionalism (Baudrillard, 2005:60-61), the unfinished openness of the object

destabilises this even further. But as the various discussions have highlighted throughout this chapter the smuggler-object affords the ability to conceal illicit mobilities through dint of its perceived functionality as a mobile object. This returns once more to the parasite, where the system teeters or oscillates between differing states of order and disorder. This conceptualisation of the smuggler-object effects a reconsideration of what certain objects do, and how they perform their supposedly prescribed function. The object bifurcates from its intended operation. They are not static: ontologically, epistemologically, spatially, temporally, or functionally. These objects, which punctuate the system of global commodity mobilities, hold within them various potentialities and un-foretold uses (Whatmore, 2002:161). In this sense the object begins to function as “an open-ended series or system” (Lury, cited in Julier, 2009:97), devaluing the functionalist assumption that an object acts according to the criteria determined by the producer or designer.

Although the question of the smuggler-object’s agency (and in particular the allegiances it develops with other objects) raises important ontological as well as ethical questions, in light of the debates on process-relationality it is clear that the smuggler-object enters into relation with other human agents. So whilst the open capacity of the object provocatively suggests that object-object relations are themselves unfinished it is also “with what (as well as who) it might connect, interact or evolve and so on” (Lury, cited in Julier, 2009:97).

Conclusions:

“The first who, having enclosed a terrain, decided to say, This is mine, was a dead man, for he immediately gave rise to his assassin” (Serres, 2007:139, emphasis in original)

It may be extending the analogy a little too far to map the logistics of commodity distribution and flows onto the one who encloses, and smuggling onto the assassin, but Serres’ contention that parasitic acts of enclosure create further parasitic cascades, does illustrate the ongoing nature of the parasitic chain of relations. It also highlights the presence of competing forces within the space of distribution. Whilst there is, of course, a potential exoticism, or danger, in abstracting the harsh realities of smuggling (the direct relationship between the drugs trade and human trafficking being just one), as convincingly argued by the likes of Bhattacharyya, the binary separation of legal and illegal trade (and by definition mobility) masks the entanglements between the two. The fear of the drugs trade is perhaps a fear of the potential threat of trade itself: the way in which “trade can be a destructive force” (Bhattacharyya, 2005:93). Similarly, the vociferous debates on limiting migratory flows fail to adequately recognise complex dynamics that surround the inherent relations between border controls and tactical undoing (Papastergiadis, 2000). This is precisely what the final section on the smuggler-object attempted to address: that perceivably ‘innocent’ objects have a deleterious *potential* through both their openness to modification and their utter ubiquity. We also saw at the outset how such concerns are intrinsic to the practices of global supply chain securities, most notably CSI and the ISPS code discussed in earlier chapters.

Overall, this chapter has attempted to adhere to Cresswell’s insistence on the various *constellations* of mobility, that is the “particular patterns of movement, representations of movement, and ways of practicing movement that make sense together” (Cresswell, 2010b:18). Mobility cannot be separated from the various

entanglements of how things or people move, the representations of movement (through the media for example), or indeed the specific strategies and tactics that are practiced or performed in order to facilitate or perhaps curtail movement. Equally, the discussion of smuggling-logistics begins to highlight the wider appreciation that within every systemic environment lie the means of its own undoing—stability and instability are coexistent. This is precisely why the theory of the parasite is a useful ‘creature’ to consider the complexity of distributive space.

We saw with Serres’ notion of the parasite how the very idea of legitimacy is problematised by the critique of productive authenticity. In terms of global trade we also saw how the apparent validity of legal over illegal trade has to be viewed in light of the murky, shadowy practices of certain echelons of global capital (Naím, 2006:36). Using the parasite we can realise how the changes in point of observation illustrate how the same system oscillates in terms of its function: systems change, but remain perceivably the same, according to the position of the observer (Serres, 2007:66). This idea was pursued in relation to the discussion of tactical-logistical knowledge whereby the selfsame geographies of interconnection and adjustment can be seen as key facilitators of illicit mobilities as well as licit. It was argued that a constituent factor of this is the *legibility* of standardised and routinised logistical networks, thus pointing to an aporetic space of indeterminacy where any sense of certainty or singular order cannot exist. With legibility comes illegibility.

This argument also formed an element of this chapter in its attempt to populate the debate on object geographies with an approach that testifies to Bennett’s argument concerning thing-power, her “hope of fostering greater recognition of the agential powers of natural and artifactual things” (Bennett, 2004:349). By addressing the smuggler-object as part of a networked, illicit tactical-logistical force there was the desire to demonstrate the destabilisation of social relations, and by definition to highlight the

inverse. For it is clear that by focusing on the ‘alternatives’ of both mobility and the objects of global mobilities one can tease out the manifestly opaque relationship between stabilisation and destabilisation across a variety of registers. In developing the notion of the shipping container as a smuggler-object the intention was to outline the complex interplay between black-boxed invisibility and forms of disguise through the production of a false space in the container, or through disguising the methods of infiltration. This process of disguise or concealment is an important one because it highlights the materiality of the object itself, in particular the relationship between surface and volume: the outer skin of the object remaining an ‘innocent’ commodity, most notably with regard to the outward coding of the container seal. Given this, the smuggler-object—represented here by the shipping container—may be defined as mundane in its appearance, bearing the hallmark of legitimated, networked mobilities. This aspect also serves to demonstrate more widely how objects project immanent creativity and inventiveness, in the sense that ‘novelty’ is bred through the entanglements of use and misuse. It is evident how the meaning and status of perceivably ordinary things, which do not typically register within the sheen of contemporary consumer culture, deserve much greater attention.

For Serres, and myself, these spaces and objects of transformation are awash with change: that is, they foster an understanding of distributive space as multiple, complex and ever-in-process, thus leading us to our final consideration. Throughout this chapter the issues of the legibility and visibility of the standardised and repetitive features of containerisation and global mobilities more broadly have been noted. Returning to the discussion of Serres’ spinning top in *Interlude II* we have to place ourselves on this teetering pinnacle, where it was difficult to perceive whether or not the top was stable or unstable. We cannot ascertain whether order or disorder prevails. In the context of smuggling logistics the legibility of such practices through securitisation point to an ever-

oscillating system. So the development of new container seal technologies are the result of the increasing awareness and legibility of smugglers' tactics. In this regard we can end with Serres argument that "the parasite gives the host the means to be safe from the parasite" (Serres, 2007:193). By this, I take Serres to be suggesting that the very presence of the parasite offers the means to recalibrate the system by recognising the symbiotic link between order and disorder in all systems. This much is proven by the growing application of the Serresian parasite to management and organisational theory (Clegg, Kornberger & Rhodes, 2004; 2005; Rhodes & Milani Price, 2010). For as already noted in the previous chapter the symbiotic entanglement of uncertainty and security facilitates further systemic oscillation, so that the theory of the parasite can be employed to highlight structural inefficiencies in complex organisations.

Conclusion

Overall Conclusions:

If we return to the opening discussions in the *Introduction* we can reflect upon Michel Serres' 'angelology' (Serres, 1995a), and in particular his desire to render the complexity of contemporary spaces of information and communication. In classic Serresian fashion his method of conflating the movement of angels with the networks of information flows exemplifies the collision of material and immaterial mobilities across temporal, spatial, and cultural registers. In doing so he mirrors the unstable and multiplicitous manner in which these various actants relate to one another. My own approach to the question of distributive space has been somewhat more grounded than his 'angelology'. Nevertheless it has been my stated objective to try and navigate through the complexity of this space-time. In keeping with Serres' *modus operandi*, my use of the shipping container as a spatial character bears some correspondence with Serres' approach. This is demonstrated by the particular moments of emergence where the container has been engaged, be that the historical trajectories of 'packaged efficiency'; the wider logic of infrastructural power, of which the container is one crucial element; the moments when the system failed through hybrid conjoinings; or again when the system unwittingly facilitated acts of illegality.

Before turning to potential areas for future research I briefly outline the specific arguments. In *Part One* the various modes of ordering was the foremost area of investigation, with the main argument focussing on temporal and spatial control, especially with regard to absolutist and relativist conceptualisation of space and time, discussed in *Interlude I*. Aspects of efficiency were crucial here, for the speed and mobility of distributive space has to be controlled through extensive organisational factors. The actual manifestations of control were considered through a variety of registers, particularly the development of the standardised, intermodal container and its associated infrastructure. The regularisation, and unitisation of space-time that I argued the container represents was set within a lengthier genealogy of the homogenisation of cargo

shape. Whilst there was a wide range of debates, the principal position adopted and argued for in *Chapter One* was that processes of inter-changeability and stabilisation were in evidence through the standardisation of the ISO container. Where such processes represent the packaging of complexity, a core position developed in *Chapter One* was that the strategic design of the container exemplifies the shift in the temporality and spatiality of global capitalism from a multiplicity of ‘stuff’ to an attempted packaging of efficiency through the delegation of effort. A further layering of standardisation can be identified with the organisation of shipping container mobilities, notably with regard to the design of spatial-material devices such as the container corner fitting. This was considered through the discussion of the organisation of container movements at London Thamesport. In this particular section the strategic production of commodity movement was elaborated, in part, through the notion of diagrammatic power, where the representational flattening of container mobilities becomes the abstract model for actual mobilities of containers at London Thamesport.

The central issue of control that this raises was then developed in *Chapter Two* where the creation of a unitised system of movement necessitates the ordered upkeep of the system, achievable through extensive security and control of the system, or what I called ‘contained continuity’. In the context of commodity distribution the aim of security is to protect the system from external infiltration, attempting to create a stabilised, hermetic entity through the production of systemic ‘divides’. It was through such a reading that I developed my focus on the logistics pipeline as a spatial metaphor for the production of continuous flow that is contained within a bounded space. Of course, given the global reach of distributive space this is not simply a definable space with bordered divides, rather my argument was that a variety of strategic measures have been developed in order to provide this, notably the *infrastructural* power of logistics and supply chain management and attempts to control mobility. In particular the legacy of military

logistics was situated as an important benchmark for commercial practices, specifically with regard to the implementation and maintenance of movement ‘at a distance’, as well as the elimination of friction. Equally, within the geographies of global commodity distribution issues involving security are increasingly paramount with regard to human and nonhuman smuggling practices (a topic discussed in *Chapter Four*), but perhaps most notably with terrorist infiltration of the distributive system itself, along with the potential threat to critical infrastructure (Graham, 2011:266-271). In relation to the securitisation of distributive space, *Chapter Two* also considered attempts to protect port-spaces from infiltration by focussing on the International Ship and Port Facility Security (ISPS) Code published by the IMO. In tandem with this, the U.S. government’s Container Security Initiative was also discussed in relation to a *distributed* security apparatus that spreads security threats—in the form of infiltrated containers—away from the immediate borders of U.S. sovereign territory by security-screening containers at their point of embarkation, rather than when they enter US territory. Via the wider politics of such practices this chapter concluded with an attempt to develop a critical positioning of infrastructural power with regard to forms of logistical violence: it was suggested, primarily through a reading of Mann’s (1986a) and Virilio’s (2006a) work, that the means to mobilise and secure power (i.e., through infrastructure) is a central facet of *objective* violence (Žižek, 2008).

Taking as its focal point the paradigmatic shifts in the conceptions of space-time seen with a range of scientific and philosophical discourses, in *Part Two* it was argued that the very notion of a purely *ordered* system cannot be instituted given the presence of turbulence in all systems. Within any system are competing forces of order and disorder. *Interlude II* attempted to provide a theoretical underpinning to the discussions in the two final chapters, and the fundamental position was that work coming out of complexity theory, studies of turbulence, and more recently with assemblage theory, highlights the

entanglements of order and disorder. Turbulence theory in particular stresses that order can emerge from disorder, so rather than seeing disorder as necessarily negative it is important to conceptualise it as inherent to natural as well as social systems, including mobility. If we follow the logic of Serres (2000) then forms of relative stasis and order arise out of turbulence. Without turbulence nothing can come into being, hence its ‘creativity’. So rather than thinking about turbulence as exceptional moments of disorder we can shift our viewpoint and think about modes of ordering as the product of maintenance (Graham and Thrift 2007), attempted pre-emption and preparedness (Anderson, 2010; Lakoff & Collier, 2010). Importantly it was argued that the unpredictable nature of turbulence means that it produces instances of assemblage that occur only once—singularities. This mitigates the approaches of classical science emphasising universality and generality, whilst underlining the importance of the specific and the localised—a key postulation with regard to the debates in *Chapter Three*. In spatio-temporal terms, such theorisations point to a decidedly more complex appreciation of the multiplicity of spatial-material relations, and the *instability* of the modes of ordering seen with conceptions of relative space in particular. This process-based, relational articulation argues that there is not a bounded space or time within which these relations occur but rather that the specificities of these active processes of change posit spatio-temporal relationalities. Thinking about turbulent relations of assemblage provides a theoretical cut into uncertainty and unpredictability.

These two notions of uncertainty and unpredictability provided an important line of flight for the final two chapters. As discussed at the outset of *Chapter Three*, images of damaged shipping containers lying on a Devon beach, alongside stolen BMW motorbikes being wheeled off by looters, at first seem rather inconceivable in the logic of the orderings of distributive space. Instead, these eruptions of disorder serve to demonstrate the undoing of the strategic principles of logistics and supply chain management. As the

‘trash’ of global commodity capitalism these deposits represent an interruption in the logistics of commodity mobility: they are the image of order gone wrong, order unordered. Fundamentally it was argued that as ‘commodities-unordered’ these are *necessary interruptions*: the flotsam is an index of the process of commodity movement torn open, both literally and metaphorically offering an insight into the ordering strategies. A process that otherwise would have remained unseen. Just as Serres states that “non-functioning remains essential for functioning” (2007:xiv) the concept of the accident serves to illustrate this very notion of an ordering system and its immanent undoing. This led to the central argument in this chapter: that spatial-material relations are unstable and unpredictable, that the way in which human and nonhuman actants combine or interact is never wholly certain, particularly in tightly-coupled systems. As a final adjunct to this, given that the sanctity of order or disorder is not possible, so the emergence of disorder is never ‘triumphant’ given the interplay of forces. As such, the competing forces of reordering attempt to posit an ongoing event of re-calibration or redoing. In this case, *Chapter Three* also considered the two main *Napoli* accident reports. However, although they differed in their conceptualisations of pre-emption as compared with preparedness, it was clear that both still adhere to “a single reality [that] will necessarily emerge” (Law, 2004:96).

Unsurprisingly the final chapter on parasitic smuggling emerged out of an interlinked set of debates on the ramifications of the highly complex interconnections instituted by globalisation. Where *Chapter Three* tried to explore how differential actants combine in unforeseen agglomerations, the final chapter took the figure of the parasite (Serres, 2007) as a model of the relationship between apparently stable commodity flows, and their immanent instability through the *parasiting* of their trajectories. Both are concerned with systemic weaknesses of highly complex spatial-material relations. For example, in a different political context The Invisible Committee argue that “every

network has its weak points” (The Invisible Committee, 2009:40). Their own intention is to block such arteries of circulation, to “jam everything” (Merrifield, 2010:212). Whilst this is distinct from the impulse of the smuggling practices discussed in *Chapter Four*, both forms of disorder point to the overarching notion of fallibility. If we consider such spaces of interconnection as material and computational infrastructures of implementation then the power offered by such forms of mobilisation is not simply figured around ‘good’ flows (Dillon, 2005:3; Nordstrom, 2007:201). Instead, the increasing interconnectivity of global commodity flows results in the growing complexity and vulnerability of connection. So, rather than the binary separation of good and bad mobilities through the supposedly bounded flows of the logistics pipeline, or the general conditions of securitisation, the issue of smuggling opens-up (in an aporetic manner) a number of critical arguments concerning the entanglements of order and disorder, and between visibility and invisibility. On this latter point, the container was used as a conceptual tool to unpack some of the earlier discussions in *Chapter One* on black-boxed, standardised efficiencies, as well as the attendant systemic inefficiencies of security devices like container seals. We saw how rudimentary practices such as repainting sections of containers or simply gluing back on rivets can mask the tactical infiltration of containers – this I termed a form of tactical-logistical knowledge. Likewise, the idea of the shipping container as a smuggler-object was developed as a central argument in order to consider how objects become powerful mediators (in the Latourian sense) of spatial-material relations.

Implications for Future Research:

Containers are physical objects. Some of them rust; the doors jam; the locks seize. In this way they present a strangely brute, material face of contemporary capitalism. Behind the apparent gloss of certain portrayals of contemporary commodity culture lies a rather

humdrum armature of metal boxes with packaged goods stuffed inside them. This is effectively the reality of commodity culture, and distributive space in particular. As outlined in the main *Introduction* the core arguments in this thesis have focussed on the spatial-material relations that constitute specific aspects of distributive space, namely in terms of containerisation and its attendant discourses. Whilst the second-wave of paratextual forces has not been a significant aspect of the discussion, these do point to some interesting areas for future research into distributive space, and I briefly consider these now, amongst others.

The impact of globalisation continues to play out in a variety of economic, social, cultural and political forms. In the context of distributive space there are important implications. We see for example the growing power of track-and-trace technologies such as barcodes and RFID tags, and the means to make things constantly locatable (Thrift, 2004b). As the brief discussion of RFID tags earlier in the thesis suggested, such technologies are becoming an evermore-important logic of commodity mobilities, especially in terms of container security (Barro-Torres et al., 2010). Thrift's work in this area has proven numerous times (2004a; 2004b; 2006a; 2012) how the concepts of position and juxtaposition (of how things, people and environments relate) are shifting, and becoming an increasingly unconscious presence in our daily lives, to the extent that mobile technologies are governed by locative technologies—the question of where one is in the world is no longer an existential problem, but rather how close one is to the nearest retail space, entertainment venue etc. A critical aspect of this lies with the acceptance that one can be, and must be, constantly located. This results in “a new kind of embodied phenomenality of position and juxtaposition” (Thrift, 2004a:186). So the various technologies of address that Thrift describes are imbricated in the *politics* of calculation and surveillance (Elden, 2007; Graham, 2011:125). It is no coincidence that a company such as Savi Technology (the major RFID manufacturer and facilitator,

specialising in commercial *and* military applications of such technologies) is owned by Lockheed Martin. Graham's (2011) point regarding the link between the development of military technologies and strategies, and their application into the everyday realm is proven. Indeed, this is precisely where Reid's conception of "logistical life" (2006:33) is representative of the increasing power of logistics beyond both the commercial and military realms, through its seepage into the biopolitical control of populations through the technologies of constant address.

A related point on the technological development of distributive space also requires some discussion. As I suggested in *Chapter One* whilst fully standardised containerisation represents an important historical moment in the development of late capitalism, the earlier forms of packaged efficiency such as prototypical container designs and mechanical handling technologies illustrate a genealogy of modes of ordering. Likewise, we are beginning to see a future genealogy emerge particularly with regard to the shift in traditional division between the producer, distributor and consumer. Although my arguments in the *Contextual Introduction* considered the interrelationships between each of these 'locational moments', especially under the logic of globalised production networks, there are interesting (although at this point in time not wide-scale) developments in manufacturing technologies that may disrupt the operative trajectory of the commodity form. This is aligned to concurrent (and quite well-established) changes in the relationship between producers and consumers, where the traditional conceptions of this relationship are topologically entangled, with the consumer taking on the role of co-creator, or 'produser', that is, "the merging of the producer and consumer in an interactive environment" (Bird, 2011:502). Whilst cognisant of the novelty-driven strategic dimensions of contemporary capitalism's ability to change the image of consumer culture, such notions of co-creation do bear-out, especially in terms of the design process. Thrift again (2006a; 2012) identifies a concomitant link between the

structural shifts in producer-consumer relations and production technologies, notably in relation to the mutation of the commodity form, through his notion of the “streaming ethos” (2006a:284). In the context of media and entertainment consumption the constant availability of entertainment forms, be it music or television shows results in a form of ‘on demand’ thinking, where there is an expectation that everything will be immediately available through download (Straw, 2009). Although one should be wary of the rather utopian (or dystopian depending on the point of observation) impulse of such claims, there are interesting changes afoot through the direct ‘outsourcing’ of production to the domestic space in the form of 3D printing (Buchli, 2010; Ricca-Smith, 2011; Richter & Lipson, 2011; The Economist, 2011). Once the cost of the hardware in the form of domestic-scale 3D printers is sufficiently reduced it is argued that consumers will be able to download files that can then be ‘printed’ three dimensionally (Gershenfeld, 2007). In terms of the ternary of production-distribution-consumption such potential changes may lead to the dissolution of the traditional function of each, so that we may see “disaggregated commodity chains” (Thrift, 2006a:290). Given such circumstances Marx’s work on transportation and communication may become even more prescient, in that the distinctions between transportation-space and communication-space become undermined (see Janelle & Beuthe, 1997:205; Urry, 2004). However, although this has the potential to significantly change the landscape of commodity culture, the overarching logic of late commodity capitalism continues to be driven by the global movement of commodities in seemingly mundane boxes.

To offer a final conclusion: the use of the shipping container then is closely aligned to my interests in the interplay between order and disorder. Of course, whilst the immanent entanglements of order and disorder are central to my overarching conceptual project, these could be made manifest across a multitude of registers and scales. Likewise, with

distributive space such entanglements might have been attended to through a range of case studies. The value of shipping containers and containerisation as critical tools lies in the immense organisational infrastructures that have been constructed to try and stabilise the complexity of interactions that constitute contemporary distributive space. In overall terms the thesis has attempted to outline how apparatuses such as the standardised container; the infrastructure of containerisation; logistics and supply chain strategies; and security procedures are all modes of ordering. Crucially, it has also made clear that such modes of ordering are always contingent and in need of continuous up-keep and maintenance. This was made transparent by the use of theoretical literature on turbulence, complexity and assemblages. So, the spatial-material relations of distributive space are inherently open to uncertainty—these are spaces, objects and relations of aporetic transformation.

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