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Five theses on understanding logistics as power

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Today logistics has become central to the orchestration of globalized trade and production. Yet, despite the focus on global connections and disconnections across a range of disciplines, the material operations that enable logistical practices have gone largely unexplored in social and cultural investigations into the operative dimensions of the global. This series of five theses provides a programmatic introduction to a longer research project that aims to reverse this situation. Understanding logistics as power means questioning many of the economic and political shibboleths of current approaches to the global, whether they derive from generalizations about neo-liberal deregulation or assertions about the historical continuity of the state. In particular, it allows a rethinking of the global production of time and space in relation to the production of living labor and the production of subjectivity.

Keywords: biopolitics; globalization; governance; labor; logistics; power; war

Thesis 1 – logistics provides an unexamined background to contemporary capitalist ways of being and knowing

Logistics is the art and science of managing the mobility of people and things to achieve economic, communication, and transport efficiencies. It involves planning and implementing the acquisition and use of the resources necessary to sustain the operation of a system. What kind of power is manifest in logistical practices? To answer this question it is necessary to conduct an analysis that recognizes both the military origins of logistics and its role in the organization of contemporary capitalism.

According to historian Martin van Creveld (1977, 5) military logistics arises in the period 1560–1715 as a reaction to what he calls the 'tyranny of plunder'. As armies became larger in size they found it increasingly challenging to live off the land by forcibly obtaining food and other supplies from populations in their vicinity. This condemned them to permanent mobility, making siege warfare a difficult proposition. The solution was to supply armies from behind. A first step was the introduction of trailing magazines, which allowed the conduct of sieges but greatly hampered the mobility of troops. Debate raged about the wisdom of creating an 'umbilical cord of supply' (36). But eventually the need to manage and conduct

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campaigns across ever greater distances and the rise of scorched earth policies that made living by requisitions impossible meant that logistics became an integral part of military affairs. The building of railways greatly enhanced the speed at which forces could be moved and supplied. And as mobility became dependent on the availability of fuel and new weapon systems required ammunition to be continually renewed, logistics emerged as an unavoidable and indeed crucial element of modern warfare. Van Creveld's gambit in *Supplying war* (1977) is to reread military history in order to suggest that the results of great campaigns, from the Franco-Prussian War to Rommel's offensives in the African desert, turned upon logistics. Whatever the truth of this matter, it is clear that logistical practices in the contemporary world have acquired a social application that extends far beyond the military sphere.

How and when logistics became a civilian practice is a matter of contention. In the industrial world there are precedents from the early twentieth century. The *Standorttheorie* devised by Alfred Weber (1909) introduced an algorithm that purported to specify the ideal location for a manufacturing plant taking into account freight rates, the agglomeration of industrial facilities, and labor costs. But it was in the post-World War II US that logistics strongly emerged as an element of business management. The 1960 and 1970s were transformative years. These decades saw the diffusion of a system analytics approach to transportation, communication, and the spatial organization of the firm, the introduction of the shipping container, the formation of business organizations and academic programs for the generation and transmission of logistical knowledge, the interlinking of logistics science with computing and software design, and the move from a cost minimization to a profit maximization approach. Scholars who study the evolution of the field refer to these changes as the 'logistics revolution' (Bonacich and Wilson 2008). In many ways, this shift in the fields of generation and application of logistical knowledge appears as an instance of the militarization of society. Practices of measurement, standardization, and calculation devised in the military sphere are adapted for civilian purposes that revolutionize business and management practices. Such an analysis is undoubtedly correct. But it can also obscure the sense in which logistics has actively formed a new terrain of politics on which struggles are and will continue to be played out. Discerning the contours of this politics means paying attention to the implications of the logistics revolution for the shifting relations of labor and capital.

Not accidentally did the rise of logistics as a civilian practice correspond with the important changes to world capitalism that began to unfold in the 1960s and 1970s. Figures such as Harvey (1989) and Jameson (1991) associate the rise of more flexible and global modes of capitalist organization with events such as the oil crisis of the early 1970s or the fall of the Bretton Woods system of monetary management. But, if viewed from the perspective of logistics, these changes are carried on the back of far slower changes. They are marked by labor struggles and attendant shifts in economic geography, including the opening of the East Asian region as a major site of industrial production. Feminist thinkers have long taught us that production never finished at the factory gates (Dalla Costa and James 1972). But in mainstream management and economic perspectives, it was the logistics revolution that smashed the factory walls, moving productive and value-adding activities well beyond the delimited spaces of industrial activity. The feedback of data concerning transport and supply deeply transformed the world of production, making it more global in scope and responsive to market shifts (Ballou 2007; Cowen 2010). Without such a flow of data there could be no just-in-time adjustments. And without robust

logistical systems, labor in the poorer regions of the world could not be efficiently exploited, making global production processes as inefficient economically as they are currently environmentally.

The implications of these shifts for understanding logistics as power are profound. They raise important political questions about the relation of capital to state, territory to jurisdiction, and labor to life. In this view, logistics is a far wider practice than that pertaining merely to the organization of production and trade. Thrift identifies logistics as 'perhaps the central discipline of the contemporary world' (2007, 95). His claim that logistics forms part of the 'technological unconscious' of capitalism suggests just how crucial it is for providing an ontological sense of orientation and position in the world (Thrift 2005, 213–26). Logistics plays a key role in structuring life in adaptive ways that constantly shift in relation to environments and feedback into material conditions. Understanding it as power means not only tracing its relevance for transformations of labor and capital but also analyzing how it impacts upon changing regimes of sovereignty, governance, knowledge, and biopolitics. In this regard the later writings and lectures of Michel Foucault are invaluable resources. As we shall see, however, the study of logistics also reveals some of the limits of Foucauldian accounts of power for understanding the currently globalizing operations of capital. To approach logistics as an unexamined background to contemporary capitalist ways of being and knowing is to question some of the most influential accounts of present transformations to economy and society, labor and life.

Thesis 2 – logistics has begun to lead strategy and tactics

Already in the era when logistics was primarily a military affair there was a sense that it had begun to play a decisive role in the unfolding of war and hence in the course of human history. An early registration of the importance of logistics can be found in the writings of the nineteenth-century French military strategist Antoine-Henri de Jomini. In his 1838 text *The art of war* (2008, 200), Jomini argues that logistics is not merely a 'science of details' but a 'general science' that plays a leading role in the organization of war and the execution of strategy and tactics. This seems a truism in the light of the developments of twentieth-century warfare and the civilian logistics revolution. Today it seems common sense that strategic decisions are limited by the resources at hand and tactical maneuvers unfold within a situation defined by lines of information and supply. But these are notions that were violently forged in the face of material developments and historical transformations. In its time Jomini's argument flew in the face of prevailing views of war, military organization, and politics.

Carl von Clausewitz never uses the term logistics directly. In his unfinished posthumous work *On war* (2007) published in 1832, Clausewitz describes what today would be classified as logistical practices as 'preparatory activities' that can be excluded from the 'actual conduct of war' (75). For him, logistics comprises all those activities in war that are a precondition, or preparatory in the sense of pre-conditional, to considerations of tactics and strategy. It is all that is necessary so that a fighting force can be taken as a given: recruitment, training, supply, clothing, sleeping, eating, drinking, marching – in short, everything required so that an army might be at the right place at the right time. Logistics is thus the condition of possibility for the conduct and operations of war, and its purpose is defined by the

needs of strategy and tactics. Indeed, these two alone are sufficient for a theorization of war and, given Clausewitz's famous vision of war as the continuation of politics, thus also sufficient for the theorization of politics.

Strategy is the art of making war upon the map and comprehends the whole theatre of operations. Tactics is the art of posting troops upon the battle-field according to the accidents of the ground, of bringing them into action, and the art of fighting upon the ground, in contradistinction to planning upon a map. Between these two poles, the abstract and the grounded, Clausewitz expounds his theory of war, leaving logistics aside as irrelevant to the art of engagement. To be sure, this approach is shaped by the technologies and conditions of the time, when most armies continued to live by raiding the territories they moved through. But the point is that Clausewitz's insights, as they feed into later accounts of war and politics, maintain this split between logistics and the conduct of war. When he declares that war is the continuation of politics by other means, it is strategy or what he describes as 'the use of an engagement for the purpose of the war' that 'borders on the political' (Clausewitz 2007, 133, 149); while tactics or 'the use of armed forces in the engagement' remains caught in the fog of war and is 'virtually limited to material factors' (74, 98). Strategy and tactics 'are two activities that permeate one another in time and space', but the relation of war to politics requires the recognition that they are 'essentially different' (80). Logistics, by contrast, is essentially a matter of administration and not political.

To understand logistics as a site of power and struggle is not only to contradict this established wisdom but also to question some of the most influential recent engagements with the theory of strategy and war. Michel Foucault punctuates his analysis of the mutations of power in the modern period with a provocative reversal of Clausewitz's dictum describing war as the continuation of political intercourse by other means. In *The history of sexuality* (Foucault 1978, 93), he declares: 'Power is everywhere [...] Should we not turn the expression around, then, and say that politics is war pursued by other means?' At stake in this inversion is an attempt to understand power in terms of force relations rather than sovereignty and law. What is fruitful for Foucault in Clausewitz's approach is not its efficacy as an applied art for the winning of battles. Rather he suggests that Clausewitz has devised something like a human science that can provide a blueprint or epistemic foundation for understanding the operations of modern power (see Reid 2003). As he states in *Society must be defended* (Foucault 2003, 46), a text that opens by reiterating his inversion of Clausewitz, the key issue is: 'Can war really provide a valid analysis of power relations?' We can answer this question by briefly revisiting Foucault's attempts to derive a new genealogy of power in texts such as *Discipline and punish* (1977), *The history of sexuality*, *Society must be defended*, and 'Governmentality' (1991). As we shall see, it is within the conceptual pincers of strategy and tactics that Foucault begins to elaborate his understanding of power. As in Clausewitz himself, logistics is subordinated to a greater political logic.

Let me begin with the chapter of *Discipline and punish* entitled 'Docile bodies' where Foucault argues that the emergence of disciplinary power in liberal societies is linked to modern military institutions and new forms of military-scientific thought that came into being in the seventeenth and eighteenth centuries. Techniques of military organization such as enclosure, partitioning, ranking, and serialization were adjusted and applied to societies as a whole. To show how these disciplinary techniques involved the ordering of relations between bodies and space, Foucault

draws on the work of the French military tactician, Comte de Guibert. Author of the *Essai Général de Tactique* (1772) (a work from which Foucault quotes no less than five times in the chapter), Guibert was an advocate of citizen armies and campaigned for a 'war of maneuver' in which forces would travel light, live off the country, and thus gain mobility, range of action, and the power of surprise. As van Creveld (1977) points out, this put Guibert at loggerheads with efforts to develop logistical systems of military supply, such as the system of trailing magazines devised by Louvois, the war minister of Louis XIV. In any case, Guibert's discussion of the tactical question of how the body is deployed on the ground informs Foucault's account of rise of disciplinary power and its wider social deployment. Noting Marx's analogy between the problem of the division of labor and military tactics, he points to 'the instrumental coding of the body' through the creation of a 'body-machine complex' (Foucault 1977, 153). He also traces how, by constituting the natural body as the object of disciplinary power, the new sciences of military organization begin to conceive of populations as species bodies defined by a common genesis, evolutionary patterns, and survival rates. His approach to military tactics thus shades into his development of the concept of biopolitics.

When it comes to the discussion of populations in *The history of sexuality*, Foucault shifts his register from tactics to strategy. In *Discipline and punish*, he suggests that tactical models of organization are most important for understanding how war invests the order of power. In the chapter on 'Method' in *The history of sexuality*, where he first makes the famous inversion of Clausewitz, he argues that war invests the order of political power as an active force that disrupts existing divisions and constitutes social relations in multiple and unstable ways. Rather than being played out between distinct and pre-constituted social groups, modern power conditions the mutability of social relations along shifting and complex lines of antagonism. There is thus a need 'to decipher power mechanisms on the basis of a strategy that is immanent in force relationships' (Foucault 1978, 97). The use of the term strategy here is not accidental. Foucault writes of the rise of a 'strategical model' by which 'the force relationships which for a long time had found their expression in war, in every form of warfare, gradually became invested in the order of political power' (102).

Importantly it is Clausewitz's notion of strategy that animates Foucault's argument here. Modern forms of power are strategic in the sense that they incorporate and function through force relations that tend to an extreme but also mitigate each other. They are thus productive of life or 'bent on generating forces, making them grow and ordering them, rather than being dedicated to impeding them, making them submit, or destroying them' (Foucault 1978, 136). In this way, Foucault begins to describe how populations are constituted biopolitically. Whereas disciplinary power evolves by tactical measures that make the individuated body the object of power over life, biopolitics involves the development of strategies that constitute bodies in relation to populations. These two dimensions of power are continuous:

> There is no discontinuity between them, as if one were dealing with two different levels (one microscopic and the other macroscopic); but neither is there homogeneity (as if one were only the enlarged projection or miniaturization of the other); rather, one must conceive of the double conditioning of a strategy by the specificity of possible tactics, and of tactics by the strategic envelope that makes them work. (Foucault 1978, 99–100)

Here we have the two poles around which the Foucauldian account of power begins to revolve in the mid-1970s: discipline and biopolitics, bodies and populations. Doubtless this is a schematic picture of Foucault's argument, which he successively elaborates in lectures and talks. In *Society must be defended*, for instance, he explores how this dynamic of power, which is supposed to exceed the juridical logic of sovereignty, becomes captured by the modern nation-state. The implications of this are extensive, suggesting not only that sovereign power continues to act within and alongside disciplinary and biopolitical powers, but also presenting an image of the state as the site where the historical, universalistic aspirations of a particular collective subject are played out. Likewise, in the famous lecture on 'Governmentality' (1991), he extends his theory of power by introducing an analysis of the powers of freedom and the ethical precepts by which individuals act on themselves. This entails a focus on the 'conduct of conduct' or the intersection between techniques of government and technologies of the self. In the remainder of his 1977–1978 lectures, *Security*, *territory*, *population* (2007a), and in the following year's lecture series, *The birth of biopolitics* (2008), the picture becomes more complicated as Foucault adds discussions of pastoral power, *raison d'état*, liberalism, and neo-liberalism. Some commentators suggest that Foucault gradually distanced himself from thinking about power in terms of war (Bröckling, Krasmann, and Lemke 2011), but there is evidence to suggest otherwise. Shortly before his death Foucault declared an interest in writing a book about 'the problem of war and the institution of war in what one could call the military dimension of society' (Foucault 1996, 415). In any case, the Clausewitzian analysis of war as hinging on the division between strategy and tactics provides the basis for his first great step away from a juridical model of power. And, as in his initial writings about power, he continues in his later lectures and talks to bury or hide the question of logistics in a maze of detail that often leads in other directions.

This is not to deny that, as Proença Júnior and Duarte (2005) argue for Clausewitz, it may be possible to derive a concept of logistics from Foucault's work. There are a number of elements that suggest this possibility: from the emphasis on a liberal ontology of circulation in *Security, territory, population* to the recognition in *Society must be defended* that power is 'exercised through networks' and 'functions only when it is part of a chain' (Foucault 2003, 29). Perhaps the thinker who has come closest to deriving a concept of logistics from Foucault's work is Julian Reid (2006), who introduces the term 'logistical life' to investigate the elaboration of strategy and tactics in *Discipline and punish* and *The history of sexuality*. Reid deploys the term logistical life to describe

> life lived under the duress of the command to be efficient, to communicate one's purposes transparently in relation to others, to be positioned where one is required, to use time economically, to be able to move when and where one is told to, and to be able to extol these capacities as the values for which one would willingly, if called upon, kill and die for. (Reid 2006, 20)

He argues that at the inception of modern liberal societies the transformation of human life into logistical life was a surreptitious project, but today, he contends, such an organization of life has become transparent. 'The capacities of societies to practice a logistical way of life', he writes, 'have become indistinguishable from conceptions of the ''quality of life'' for human beings' (Reid 2006, 35). For Reid, logistical life is a third term derived from Foucault's discussions of strategy, tactics,

and the militarization of society at the dawn of the modern era. But it finds its full applicability in the analysis of contemporary societies and, in particular, in describing the quality of life that current network-centric forms of warfare purport to protect. Importantly, logistical life is not a concept developed by Foucault himself. Reid performs a powerful extension of Foucault's writings on war and power, but the very fact that he needs to derive or infer an engagement with logistics indicates that it is secondary. In Foucault, as in Clausewitz, the concept of logistics is never directly produced.

Perhaps this is unsurprising. In the final years of Foucault's life the developments associated with the logistics revolution were only getting underway. We cannot expect him to have foreseen the role that logistics would play in contemporary capitalist production and the governance of transnational worlds. Deleuze (1995, 174–5) comments that Foucault's analysis of disciplinary societies insufficiently accounts for the importance of communication technologies in 'new forms of circulation and distribution of products'. But Foucault certainly developed strong arguments about security, circulation, and the biopolitical implications of networked forms of governance. Nonetheless his account of the mutations of power in modern societies is heavily influenced by the Clausewitzian vision of war as a movement to extreme and violent conflict conditioned by the mutual interaction between forces. This has implications for his engagement with questions of circulation and knowledge that pertain to the logistical organization of societies.

It is not uncommon for military historians to contrast Clausewitz's relative neglect of logistics with Jomini's emphasis upon its growing importance (see, for instance, Prebilič 2006). Nor is it unusual for thinkers like De Landa (1991) to argue for the centrality of logistics to modern military practices. De Landa suggests that logistics 'came to dominate the martial landscape' during World War I when its capacity to contribute 'to the assembly of the different tactical systems' and put 'severe constraints on the strategic options available to commanders' was vastly augmented (108). But thinkers who document the logistics revolution suggest that it is only with the civilianization of logistics that it emerges as a value-generating practice that truly begins to lead the strategy of firms and the security of nations (Allen 1997). Importantly this process of civilianization coincides with the computerization of logistical systems and the orchestration of production and trade according to the workings of supply chains. Such change implies a decentralization of the decision-making practices that apply to strategy and tactics. The efficient management of information traffic across computer networks and supply chains involves a process by which packets of data interact with each other under the direction of a heterogeneous array of software routines and hardware devices. Human actors introduce degrees of lubrication and friction into these efforts of co-ordination. Logistics becomes a means for maximizing the production of value across networks, and this means that it becomes relevant for the analysis of capital in its global moment. At stake in this unprecedented production of value is the emergence of a form of power that both theories of centralized sovereignty and theories of dispersed governmentality struggle to describe or explain.

Thesis 3 – logistical power is political power

Understanding logistics as power requires a rethinking of the political. The elaboration of a Clausewitzian view of politics that revolves about the relation of

strategy to tactics is a feature that extends beyond the work of Foucault. If, as suggested above, such an approach to the political is only one aspect of Foucault's attempt to develop a more complex account of the evolution of power, it acquires a more pronounced articulation in the writings of his successors. Take the case of Michel de Certeau who in *The practice of everyday life* (1984) elaborates the Foucauldian discussion of the split between strategy and tactics to juxtapose the top-down power of governments, corporations, and institutions with sneaky and resistant practices that operate within the gaps of conventional thought and the patterns of everyday life. For de Certeau, strategy is 'the calculation (or manipulation) of force relationships that becomes possible as soon as a subject with will and power (a business, an army, a city, a scientific institution) can be isolated' from an environment (35–6). A tactic, by contrast, is 'a calculated action [. . .] that must play on and with a terrain imposed on it'. Drawing directly on Clausewitz, de Certeau associates tactics with trickery and describes them as 'the art of the weak' (37). In his essay, 'Walking in the city', strategy implies an abstracted bird's-eye view of the urban landscape, while tactics are associated with the spatial practices of the pedestrian. The argument is that tactics 'secretly structure the determining conditions of social life' and elude the manipulations of strategy 'without being outside the field in which it is exercised' (de Certeau 1984, 96). In this way, tactics are linked with resistance and subversiveness, whereas strategy involves 'rational organization' that must 'repress all the physical, mental and political pollutions that would compromise it' (94).

Where is logistics in this vision of the political? As in Clausewitz and Foucault, it is buried or hidden under a mass of detail. We might push this point by imagining that de Certeau's pedestrian walks in a contemporary city and carries a smartphone in her pocket. The use of such a device alters the experience of traversing the city not only by enhancing the pedestrian's capacity to pursue connections with a multiplicity of other sites but also in the way it registers her location and keystrokes, serves them up to strategy's databases, and then feeds them back to augment her interaction with the environment. Tactics here can no longer be understood as simply subversive of strategy. As Thielmann (2010, 6) explains, the use of locative media devices such as smartphones means that 'places are subject more and more to logistical modeling concepts'. This entails the presence of vast amounts of infrastructure, both hardware and software, which, alongside other logistical systems such as those associated with energy and water supply, provide the mediating networks of contemporary urbanism. Graham and Marvin (2001) demonstrate how such logistical networks shape urban form and process. But it is also necessary to appreciate how these networks actively contribute to the setting and staging of political possibilities. Easterling (2010) describes this capacity of logistics as 'active form'. 'Active forms', she writes, 'are capable of an infrastructure change that broadly transforms the disposition of an organization or environment' (76). Here we begin to get an inkling of the political power inherent in logistics. But there is more to tell.

That logistics is always adapting to contingencies tells us much about its pervasive power. Workers in first-line logistics jobs such as machine operating, freight forwarding, and inventory management have long been aware of the qualities of this power, not least because its effects cross them in a double way. On the one hand, logistics workers are subjected to ever more calibrated devices of performance measurement. These extend beyond previous modes of Taylorist scientific management. Labor practices in these industries are increasingly measured by technical

systems of key performance indicators (KPIs), which feed back into logistical systems in real time as if with the desire to conjure away the difference between living labor and its abstract measure. Such real-time measurement of labor performance has contributed to the highly precarious nature of work in the logistics industries, not just among transport workers but also among the growing number of workers (often women) in data processing, dispatch, and warehousing. On the other hand, logistics workers have realized they hold a strategic position in global production systems. Small actions on their part can have widespread effects. Global supply chains, which must often maintain a balance between leanness and agility, can be extremely fragile. This provides new opportunities for labor organization since actions that occur at one point in the chain resonate along it, having potentially devastating effects both upstream and downstream. The port worker who engages in go-slows or the courier who deliberately becomes ill at key times in the year reacts to the vulnerabilities of supply chain networks in which he or she works. While capital can respond to these actions by increasing stock levels or creating alternative distribution routes, it can do so only at the cost of decreasing the leanness of the production networks it has strived so highly to create. Workers' collective understanding of the logistical networks in which they work can thus become a key piece of political knowledge if studied and applied in systemic ways.

Introducing the question of labor to the study of logistics has important ramifications. In Marx's formulation, the distinction between living and abstract labor was central to establishing the terms for an analysis of the production of labor power as a commodity. Living labor he describes as 'form-giving fire', the subjective capacity for labor embodied in the worker's corporeality, insertion into networks of co-operation, and positioning in the concrete social circumstances under which labor is performed (Marx 1973, 361). Abstract labor is the generalized temporal measure of labor that enables its translation into the language of value and provides the regulatory nexus for the establishment of a world market for the commodity of labor power. But the distinction between abstract and living labor also has important political consequences that can be understood in the frame of control and resistance. This means it can be utilized to shed light on the qualities of power inherent in logistics, which is a set of practices that comes to the fore at the same historical time as neo-liberal doctrines become contagious and economic forms of power begin to gain dominance over political processes. The tension between living and abstract labor, which derives from the fact that the multiplicity and concreteness of the former cannot be fully reduced to the latter, has never been as intense and wide as under current capitalist conditions. Marx's analysis continues to inform arguments about the impossibility of establishing socially necessary labor time as a means of measuring labor predicated on human co-operation and communication (Negri 1992) or the tension between universalism and difference that invests the concept of capital (Chakrabarty 2000). Logistics presents the fantasy of eliminating this impossibility and this tension through technical feats of governance and measure.

The software-enabled modes of monitoring and co-ordination facilitated by logistical systems extend beyond previous Taylorist methods of scientific management in so far as they operate in real time, seeking to tether labor to the instantaneous feedback of its measure. KPIs, standard operating procedures (SOPs), quotas, benchmarks, and audits all exist in their own universe of auto-affirmation. There is an effort to seal the relationship between logistics software and workers'

self-regulation within a closed circuit. But this dream, which exists in correlate to the fantasy of creating a smooth or seamless world for the passage of goods and capital, is susceptible to disruption from the unruly world of living labor. The interface of logistics and labor produces a space where technologies of 'fault tolerance', which enable a system to continue operating despite external disruptions or the failure of one of its components, meet sabotage.

Foot-dragging, wildcat strikes, the damage or destruction of machinery, the blocking of traffic – these are all old tactics. But sabotage demands that they are combined with a sense of what Womack (2006) calls 'strategic position' – that is, knowledge of where and when an act of sabotage is liable to resonate most widely and effectively. In fact, sabotage cannot work merely between the poles of strategy and tactics because it requires the presence of a logistical system through which the damage or delay must be transmitted. Not by accident does Émile Pouget in his classic text *Le Sabotage* (1911) offer the examples of actions pursued by railroad and telegraph workers. In his book *Carbon democracy* (2011), Timothy Mitchell argues that sabotage has become absolutely central to understanding the connection between socio-technical relations and political struggle. Contemporary logistical forms of capitalism have vastly multiplied opportunities for relatively minor malfunctions, mishaps, or interruptions to have widespread effects. At the same time, the capacity for logistical systems to adapt to or compensate for such disruption has increased. The introduction of real-time KPIs, SOPs, and other measures of labor performance, which tend to have an individualizing effect on workers, also poses challenges for labor organization. Logistics builds the networks within which these relations unfold. Due to the global spread of these networks, the abstraction of labor is at once ever more efficient and ever more susceptible to calculated actions and disturbances. The 'active form' of logistical systems has opened a domain of struggle in which the powers of abstraction meet forms of life that act within and against the practices of co-ordination and control at hand.

The distinction between abstract and living labor cannot be directly mapped over that between strategy and tactics. The pivotal role of logistics in negotiating both these distinctions points to the urgency of developing a conceptual apparatus for understanding the power inherent in it. At stake is something more than the presence of a neutral technological background against which struggles are carried out. Logistical systems produce what Foucault called disciplinary and biopolitical forms of power, but they also produce their own specific form of power that at once generates value, imposes measure, and facilitates circulation. It is significant that Foucault, in a 1976 lecture entitled 'Meshes of power', makes reference to Marx in his attempt to derive a conception of power that is not merely juridical. He points to the existence of 'local, regional forms of power', recalling Marx's insistence on 'the simultaneously specific and relatively autonomous, in some way impermeable, character of the *de facto* power that the employer exerts in a workshop' (Foucault 2007b, 156). He thus cautions against attempts to 'Rousseau-ize Marx' or insert him into 'the bourgeois and juridical theory of power' (158–9). This is significant given the discussion of the disciplinary and biopolitical forms of power that Foucault goes on to elaborate in this lecture. In writings with Sandro Mezzadra, I have correlated the subjective targets of these heterogeneous forms of power (individuals and populations) with the two sides of the Marxian concept of labor power:

> The 'living' body produced as the 'bearer' of labor power and the general human potency epitomized by the concept – or, from another point of view, the individualized experience of the worker and his or her living in the reality of social cooperation. (Mezzadra and Neilson, forthcoming)

What needs to be added to this analysis is an awareness of the logistical practices that connect the individualized worker and the general body of social co-operation across diverse geographical scales. Such practices, I contend, produce a form of power that can be fully specified neither in disciplinary nor biopolitical terms.

Thesis 4 – logistics negotiates the heterogeneity of global space and time

Logistics is increasingly a programmer's game. Its use of software systems, from enterprise resource planning (ERP) to cloud computing, provides a means of modeling the world as a series of economically valued objects and relationships. As Golumbia (2009, 165) comments, these systems are 'as much ideology' as they are 'actual software'. In other words, they are specifically developed and implemented for the purposes of defining and controlling social actions and actors in ways that privilege the maximization of profit and an orientation to capital. Importantly, however, logistical systems are unable fully to discipline the diversity that inhabits global production and distribution processes. Giving rise to networks that span multiple cultural contexts and different regimes of territory, authority, and rights (Sassen 2006), their operations are determined as much by forces and actors *outside* these networks as by internal governance standards. As Tsing (2009, 150) observes, contemporary supply chains show how 'diversity forms part of the *structure* of capitalism rather than an inessential appendage'. In previous writings, I have attempted to map the contours of this diversity, investigating how logistical methods of governance, measure, and management interact with sovereign powers to shape contemporary forms of labor and mobility (Neilson and Rossiter 2011). Here I want to think about how logistical power is involved in producing and negotiating the heterogeneity of global space and time. In this respect logistical power is not merely local or regional but in addressing the connections between specific situations or niches cuts across and rearranges relations between other forms of power, including the juridical power that Foucault was so keen to disavow.

One of the ways in which logistical power intersects the heterogeneity of global space and time is through the production of geographical entities such as the special economic zone or trade corridor. These have a long history stemming from ancient free ports and trading patterns. In recent decades, however, they have multiplied in both number and type as the logistics revolution has enabled more globalized processes of assembly and production. 'Just-in-time' and 24/7 are the temporal mantras that accompany the worldwide spread of such spaces. Indeed the trade-off between labor costs and geographical location cannot be made without taking logistical considerations of transport and communication into account. The distinction between production and distribution begins to break down as technologies of circulation are introduced into the flow of production itself. This is where the value-generating capacity of logistics becomes manifest. The capacity to move goods, whether by wire, cloud, or vehicle, comes to be seen not as an unavoidable cost to be lessened but as an opportunity for profit generation. And with this comes the global search for cheap labor. Zones and corridors are the spatial and temporal technologies that respond to this search. Not only are they formations that interrupt the continuity of state territories and normativity according to the logic of what

Aihwa Ong (2006) calls 'graduated sovereignty', but they are also sites for novel techniques of governance that introduce differentiation into global space in ways that enable and establish the conditions for the accumulation of capital.

The debate on zones has been intense. They are typically established by the sovereign decisions of states that seek to jump-start their economies by attracting foreign investment and waiting (often in vain) for spillover effects. Yet these decisions place the zone partially and in some cases even fully outside the sovereign control of the state. As Easterling (2012) explains, the zone 'presides over a laundry list of exemptions which are sometimes mixed with domestic civil laws, sometimes manipulated by business to create opportunistic mixtures of international law, and sometimes adopted fully by the host nation'. The question of whether such exemptions should be understood as forms of sovereign exception (as theorized by thinkers such as Schmitt and Agamben) or as falling into different patterns of normative governance is an important one. But it has to be dealt with on a case by case basis and does not necessarily tell us much about the kind of power that inheres in logistical systems themselves. One complexity is that businesses that set up in economic zones are often bound by protocols, norms, and standards issued by various bodies, including actors within the supply chains in which they are operating. Take the example of a Hong Kong-owned IT factory located in the Songjiang Industrial Zone on the outskirts of Shanghai that I visited as part of a project called Transit Labour: Circuits, Regions, Borders (http://transitlabour.asia). At the final step of the supply chain the printed circuit boards manufactured in this site find their way into a variety of commodities which are packaged and branded by so-called original equipment manufacturers (OEMs). These OEMs issue the factory with certificates attesting their adherence to industry and client-determined environmental protocols. These include standards such as ISO14001 for the promotion of 'effective and efficient environmental management', RoHS (Restriction of Hazardous Substances Directive), WEEE (Waste Electrical and Electronic Equipment Directive), as well as OEM-mandated standards such as SS-00259, a Sony Corporation Technical Standard pertaining to environment-related controlled substances.

Adherence to these protocols directly affects the production of value at other points in the supply chain. Beyond their function in supply chain management, the certificates confirming compliance have become linked with branding devices that offer reassuring and desirable messages to environmentally conscious consumers. This production of value occurs through a multiplicity of industry and individual regulation mechanisms, increasingly monitored by private agencies rather than sovereign entities. It also functions in multiple and ambivalent ways – compliance may reflect actual improvements in work-place health and safety – bringing producers and consumers into a web of relations shaped by logistical processes. These protocols (which are accompanied by a host of corporate codes, charters, recommendations, and best practices), are no longer mere public relations stunts or moral obligations that corporations perform on the stage of global civil society. They have acquired a legal weight that is no longer anchored to the sovereign power that Foucault saw as superseded by governmentality but is rather fragmented through plural domains which are at once globally extensive and sectorally bound. Arguably a new body of law and para-legal norms is emerging alongside and even against national and international law (Teubner 1997). The rules and standards that generate a particular kind of ecological branding device, for instance, are neither publicly comprehensive nor territorially differentiated. Clearly we have not entered a

post-sovereign age where nations have ceased to exercise power over their territories and populations, but we have entered an era in which economic and state sovereignty has been disaggregated to an extent even neo-liberal theorists did not anticipate. This inaugurates a structural transformation of social and economic life, ushering in a new valency whose potential for political power combines distributed networks of communication and transport with focal points of intervention.

Logistical networks or supply chains are strange entities in which extralegal collaboration between parties is possible despite the fact that networks of contractual obligation are formed. This is because contractual obligations only bind parties that link directly to each other in the chain, while, in well-established supply networks, parties that are not directly linked can reach collaborative agreements or even just understandings that hold great economic significance. The question of legal responsibility in a supply chain is complex. Precedents have been set for liability that moves upstream, passing through links in the chain and breaking the so-called contractual veil (Teubner 2009). At the same time, contractual agreements in supply chains are becoming increasingly indistinguishable from financial instruments. This applies not only to the risk-sharing contracts that have become an important part of supply chain co-ordination (Arshinder, Kanda and Deshmukh 2008). Take for example the bill of lading, which is the principal contractual document in containerized maritime transport. As Sergio Bologna discusses in his book *Le multinazionali del mare* (2010), this can become a financial asset in so far as it is negotiable. The contractual prevalence of delayed payment agreements means that the bill of lading acquires a value that can be negotiated freely on the market. This is particularly visible when merchandise is sold during the course of transport and the new owner has also to purchase the bill of lading in order to retrieve the goods from the carrier, who has the contractual right not to deliver in case of non-payment. Logistical practices in this case must negotiate the barriers between financial and legal orders, which are both increasingly globalized.

Such negotiations are also pertinent to the operation of trade corridors in which logistical practices facilitate the movement of goods. The emergence of container freight swap derivatives allowing parties to hedge and speculate against indexed rates established by agencies such as Drewry Shipping Consultants and the Shanghai Shipping Exchange means that the viability of trade corridors now rests as much with financial manipulations as with market demands for transport between various sites (Dupin 2010). The relevant indices provide weekly assessments for container freight rates, daily forward price estimates, and a bank of historical price movements for major global shipping routes such as Shanghai–Rotterdam or Guangzhou–Los Angeles. These facilitate price risk management by providing spot prices and final benchmarks against which derivate contracts can be negotiated. Logistical operations in container shipping thus interact with financial hedging activities in which buyers and sellers of transport services aim to level up their profit and loss. This process of financialization ghosts the material flux of logistical operations. There is truth to Allan Sekula's claim that 'if the stock market is the site in which the abstract character of money rules, the harbor is the site in which material goods appear in bulk, in the very flux of exchange' (Sekula 2002, 12). Business event processing software developed for financial markets has been repurposed for logistical purposes, including the tracking and berthing of container ships. And just as critics like Sassen, Negri, or Marazzi talk about the sovereignty of financial systems or finance in command, so it is also necessary to analyze the control exercised by logistics.

Financial systems, however, are just one of the many global orders that logistics must negotiate. Logistical practices also encounter the fragmented order of global law, the moral facade of corporate social responsibility, and a contradictory and increasingly dispersed mire of standards, protocols, and best practices. Economic zones and trade corridors are just two examples of the spatial and temporal formations that arise with such encounters and negotiations. They generate new forms of polity that established economic and political powers have difficulty to govern or control. Logistical power, by contrast, is adept at balancing the shifting and uneven relations between different global orders. This capacity is intimately linked to the way in which it negotiates the heterogeneity of global space and time. The ability of logistical power to rearrange or assemble other forms of power, including sovereign and governmental powers, rests on its capacity to perform both of these negotiations at once.

Thesis 5 – logistics produces subjectivity

In confronting the fragmentation of global orders, logistics also encounters another face of excess. Multiple standards and protocols come to bear upon the organization of logistical supply chains, making them complex and internally bordered mechanisms that are highly susceptible to the disruptions of workers who build and maintain them. The production of labor forces along these chains and networks is not an a-priori factor but a highly contested process in which the production of subjectivity is immediately at stake. Earlier I associated the subjective targets of what Foucault calls disciplinary and biopolitical power with the embodied life of the individual 'bearer' of labor power on the one hand, and the notion of species life in Marx as a collaborative and social category on the other. In conjoining these aspects of subjective life logistics introduces techniques and technologies of mediation that not only enable co-operation at a distance, as in scenarios of 'virtual migration', but also definitively fracture the figure of the citizen-worker that populated the work-place in the golden age of the nation-state.

The negotiations and conflicts that occur at the logistics–labor interface have two important consequences. First, despite the individualizing effects of techniques such as real-time performance management or the introduction of standard operating procedures, it becomes increasingly difficult to identify the individual bearer of labor power with either the legal person who freely sells labor power in its commodified form or with the citizen who exercises rights in a particular labor market. Second, it becomes more difficult to encounter the collective body of social co-operation in what Linebaugh and Rediker (2000) call the 'motley crew' or the multi-ethnic and revolutionary subject that manned the vessels of the early modern Atlantic. This is not to say that contemporary logistical work-forces are not diverse or politically militant, since the opposite is frequently the case. Rather it is to register how the interaction of these populations with systems which seek to co-ordinate or 'crowdsource' their labor sets up their subjectivity as a kind of battleground between processes of subjection and subjectivation. Logistics at once enables and impedes the unruly activities of the subjects it works on and produces, which is to say that even in its best-planned forms it risks generating untenable scenarios. The possible breakdown of logistical systems is often most pronounced at points in the network where interoperability emerges as a problem – for example, where a small firm running platforms such as Internet Messenger or Skype interacts with a large

corporation that runs specially customized versions of proprietary supply chain management software. The ability to keep the widgets flowing rests on the capacity to co-ordinate individualized bodies of labor across different sites. This is why the logistical fantasy of creating a frictionless world is so intimately wedded to the desire to eliminate the gap between living and abstract labor.

One way to tell the tale of the logistical production of subjectivity is to say that logistical control seeks to close the gap between living labor and its abstract measure but, in so doing, also reveals the barriers to such closure. Such barriers are not given conceptually but rather forged through material struggle. Whether through the strike or sabotage, hacking or dropping out, there is a moment of excess in which labor in its living form can refuse integration into the system of measure. This can never be a once and for all refusal but must be continually reasserted and renegotiated as logistical systems evolve, inserting themselves in various biopolitical circumstances, across different territorial spaces, within social relations, across time, within the organization of firms, supply chains, and so on. Nor should this moment of excess be understood as a simple escape from logistical measure, since the slyness of logistics consists in its always compromised abilities to counter escape or to integrate acts of refusal back into the database through logics of fault tolerance. The subject produced on the cusp of logistical control is thus a politically ambiguous figure. More accurately, logistical operations involve a production of subjectivity that occurs across a political space in which labor and capital are unevenly aligned and even susceptible to merging. The heterogeneous body of living labor is frequently presented as a form of fixed capital that is essential to the upkeep of smooth patterns of circulation. At the same time it can fluster or sabotage the system, leaving logistical forms of power in a situation where they are unable to reproduce the framing of their operations.

The fact that capital can employ logistics to reroute around sites of disturbance means that isolated incidents of unruliness, even if they resonate widely through the system, are more effective if supplemented by actions that work across and along supply chains. In this respect, it is crucial to register how capital negotiates social and cultural difference since contemporary supply chains are often global in extent and necessarily cross diverse social and cultural situations. A well-worn critical perspective sees difference as external to capital and indeed threatened by it. By this account, the abstraction of labor subsumes the specificity of living labor and thus functions as a kind of machine for destroying difference. An opposing view understands difference as living 'in intimate and plural relationships to capital, ranging from opposition to neutrality' (Chakrabarty 2000, 66). Proponents of this approach argue that the specific circumstances of living labor interrupt the universalizing narrative of capital since abstraction always implies a grappling with the differences at hand. This is borne out by the workings of contemporary supply chains which link divergent economies and cultures in often awkward ways. Tsing (2005, 4) writes of the 'unequal, unstable, and creative qualities of interconnection across difference', the misunderstandings and frictions, that are not only empirical features of supply chains but also essential to their functioning. From this viewpoint, a vision of international solidarity that emphasizes mutual understanding and identification of workers across distant global sites misses the point. If misunderstandings and performances of difference entrench the niche structure of the global economy and reaffirm the profitability of supply chains, we need new models of solidarity that can negotiate difference in ways that displace

logistical power. 'Contingency', as Rossiter (2012, 26) reminds us, 'is the nightmare of logistics'.

Returning to the question of logistics' military origins, we can conclude by asking whether the production of subjectivity as a battle-ground implies a notion of struggle between pre-constituted social parties. The answer to this question is no. Logistics makes its subjects anew, which is to say that it produces and composes the parties that it brings into relation, although never in totalizing ways. The point is that this kind of relation cannot be fully understood in the eye of political models that emphasize the split of strategy and tactics. Logistical power has superseded such models. Understanding it means accounting for the Foucauldian model of power as force relations but also reaching beyond it in an attempt to track current global articulations of state and capital, territory and law, and labor and life. There is an urgent need to bring logistics out from the political shadows. Whether in the operations of governance and sovereignty, the tensions between living and abstract labor, or the generation of fragmented norms on the cusp of subjectivity's excess, logistics has broken from the realm of the pre-political to become a fully fledged field of struggle. This is also to say that logistics is no longer subservient to strategy and tactics but, in ways that are evident in the world of global trade and production, has begun to lead them. Working within and against logistical systems has become a crucial political task of the present.

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