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Logistical Worlds

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The unruly worker, the software glitch, wilful acts of laziness, sabotage and refusal, traffic gridlock, inventory blowouts, customs zealots, flash strikes, protocological conflicts and proliferating standards. Disruption generates logistical nightmares for the smooth-world operations of ‘supply chain capitalism’.¹ Contingency prompts control to reroute distribution channels and outsource labour to more business friendly client-states and corporations. Enterprise resource planning (ERP) software parameters are adjusted to calibrate key performance indicators (KPIs) in ways that demonstrate enhanced productivity and economic efficiencies. Peasants revolt across IT special economic zones in West Bengal and the infrastructural transformation of farming land comes to a grinding halt. Global architectural firms export Chinese visions of high-speed economies coupled with new world urban integration and social utopias. Shipping container yards and warehouses coordinate the movement of people and things through technologies of remote control. Wharf-side loading and unloading of cargo becomes increasingly automated, with labour displaced by algorithmic tracking devices and human oversight of machine-operations.

These are possible scenarios of *Logistical Worlds*, a computer game that does not as yet exist. Set against operational fantasies of real-time labour management and the governance of things within logistical industries, this article registers code as a site of struggle for labour and life. Located somewhere between *SimCity* and the *Grand Theft Auto* series, *Logistical Worlds* envisages a multiuser game environment within which players collectively stage wildcat strikes at port facilities, misplace consignments in container yards or write code for patches that mess with models of supply chain integration by rerouting stock to warehouses already burdened with excess inventory. Whether it is a technical process or operative principle, *Logistical Worlds* explores code as a system of the future-present in which living labour must reckon with logistical regimes of governance and control.

—PARAMETERS OF PLAY

The tension between the capacity of computational systems to govern in non-representational ways through the rule of code and the various contingencies special to living labour will serve as an analytical architecture in an ongoing study of global supply chains. Initiated by the Transit Labour project, we intend *Logistical Worlds* to help draw out aspects of these tensions within the parameters of a video game.² The term ‘parameter’ is invoked in two key ways here. First, it is used as a border concept that delimits the range of activity and action. Second, the article draws on the field of computer science where a parameter is understood as a function, command or ‘formal argument’ that establishes the reference for an ‘actual argument’, which then executes the command of the parameter.³ A change in parameters thus alters the operation of a program, model or simulation. In the case of *Logistical Worlds*, the play of the game is specific to the values that define functions of parameters. This suggests that gameplay is determined by parametric rules, and here one always wants to keep in mind that within game space rules are accompanied and perhaps preconditioned by the possibility of breaking and remaking the rules through the aid of cheat codes and ‘mods’ (game modifications).⁴ The ability to cheat the system is central to the gameplay of *Logistical Worlds*. Registered through the contingency of the event as it arises through the disruptive force or interpenetration of the constitutive outside, the capacity to break the rules

serves to test the stability of global supply chains and logistical operations as they rub against labour practices.

Logistical Worlds aims to be a game that disseminates a critical analysis of supply chain capitalism and logistical labour, while also shaping the practices and methods of collective forms of research.⁵ How, for instance, might digital video games be understood and analysed for the ways in which they inform the remodelling of urban spaces and labour conditions? Such a question can also tell us something about how urban spaces are regulated within the topological space of the game. The game and its parameters of play, in other words, become the empirical ground upon which methods are designed, concepts are produced and analysis emerges.⁶ One key reason for this has to do with the way the internet and the rise of big data aggregation, predictive analysis and social network mediation produce algorithmically determined coordinates that modulate our desire and quantify our experience of the world.⁷ As distilled in a recent essay by Fenwick McKelvey, Matthew Tiessen and Luke Simcoe, such operations are underscored by a political economy of data: 'The collective activity of humanity provides the data that informs the decision making processes of algorithmic systems such as high-frequency trading and aggregated news services that, in turn, are owned by those who wield global power and control: banks, corporations, governments.'⁸

Within the play of *Logistical Worlds*, part of our plan is to design counter-strategies along the lines Brian Holmes identifies as: 'Critical communities of deviant subjectivity, forming at the site of the eviscerated private/public divide, [which] are not subcultural frivolities but attempts to reinvent the very basis of the political.'⁹ As Holmes then notes: 'What's at stake is the elaboration of different functional rules for our collective games, which in today's society cannot be put into effect without the language of technology.' While Holmes is speaking of games here in the more collective social sense of a hack or political intervention, there is nonetheless something to be taken from the idea of using video games to test an ensemble of functional rules or parameters specific to the operation of global logistics industries and their supply chains. The development of a serious video game such as *Logistical Worlds* might then work as a mediating device through which to think about the politics of logistical systems that increasingly govern labour and life, finance and things.

Falling within the genre of serious games (variously known as educational, critical, tactical and activist games), *Logistical Worlds* will be an exercise in modelling a range of logistical settings such as ports, warehouses, shipping and transport routes in order to draw attention to complex material relations between logistics, computing and labour. The genre of serious or activist games within digital formats has a short but venerable history. Examples like *Escape from Woomera* (2002) and Molleindustria's various tactical games come most immediately to mind. With their interest in social and political critique of government policy on migrant detention, the experience and condition of precarious labour, electronic waste, media concentration and globalised fast-food production and consumption chains, such games can broadly be grouped within the culture of the counter-globalisation movement as it was emerging at the time. Serious games such as *Third World Farmer* (2005/2006), *Darfur is Dying* (2006) and *Climate Challenge* (2007) hold a less radical agenda, and instead aim to educate players about civil society concerns and ecological challenges.

In their book *Games of Empire: Global Capitalism and Video Games*, Nick Dyer-Witford and Greig de Peuter argue: 'Games not only cultivate the imagination of alternative social possibilities; they also present practical tools that may be useful for its actualisation.'¹⁰ They go on to observe:

Tactical games, polity simulators, and also the self-organized worlds of MMOs [massively multiplayer online games] all emerge as part of a wider autoludic culture in which the ability to code, change, and copy digital culture is diffusing.¹¹

These, in a sense, are obvious points of reference for anyone interested in designing critical, activist games. Perhaps less apparent is the resonance with the animated equivalent of 'grey literature': the myriad corporate training videos that simulate picking and packing in warehouses, the automation of port operations and the transit of rail and trucks across urban settings—all of which contribute to the production of a subject special to logistics: namely the training of the organisation man, a persona first encapsulated in William H. Whyte's best selling book published in 1956.¹² With the advent of transnational capitalism and the informatisation of organisational practices, particularly since the 1990s, logistics marks a shift away from the bureaucratisation of society reproduced through the institutional settings

of the firm or government agency. This did not result in the passing of the organisation man so much as his transformation into multi-ethnic and gendered subjects whose once secure and now perpetually uncertain employment is beholden to the interpenetrative power of code. Nor could we say that society has become any less bureaucratic. Our everyday activities are monitored and data-mined like never before, though in ways more abstracted and obscure than previously. One thing that particularly stands out in the logistical paradigm is the ways labour and workers' knowledge is increasingly transferred to the algorithmic agency of machines and code.

The algorithmic action of logistical optimisation translates contingency as that which is contained, rerouted, integrated, adding value. For Matthew Fuller and Andrew Goffey, 'there is a sense that a decision that is mediated through a series of obviously disinterested data-crunching algorithms has greater trustworthiness than decisions mediated through the representations of greedy, lazy, whining employees'.¹³ The 'stupidity' that Fuller and Goffey attribute to the 'concrete closure' invested upon the empirical verisimilitude of data might be offset to some extent by the irrationality of experience, if only experience was not so often absorbed into metrics that quantify our encounters with the cloud. The question of decision requires a mediation of relation that separates the refusal of optimisation (contingency) from the incorporation of desire (logistical control). At stake is the 'authority to act' and with it the question of action itself.¹⁴ How game design brings user experience and acts of play together with programming data on labour productivity that becomes corruptible upon extraction by commercial machines could function as a technique of dissimulation in the development of *Logistical Worlds*. Acts of play become acts of deception.

—LOGISTICAL KNOWLEDGE

Since the Cold War, game theory and system analysis have been at the core of the managerial science of logistics. Computational models of conflict scenarios within procurement networks and supply chains have played a key role in the technocratic management of people and things. Patrick Crogan's *Gameplay Mode: War, Simulation and Technoculture* situates game development firmly within the military-industrial complex.¹⁵ From World War II, the military apparatus organised itself around

models of pre-emption in the form of logistical simulation games that strive to 'foreclose the future' in 'the war on contingency'.¹⁶ The problem of contingency—or the 'incalculability of tactical space'—has origins in the writings of Prussian soldier and military theorist Carl von Clausewitz, while the technocratic or administrative aspects of military operations dates back to the War of the Spanish Succession (1701–14), where Friedrich Wilhelm I realised the need for 'officials with cameralistic skills' to mobilise supplies and fresh troops for standing armies.¹⁷ Officers equipped with such skills 'opened up the possibility ... to switch from a purely military career to an administrative one', thus instantiating the conjunction of theatres of war with the management of civilian life.¹⁸ War games mirrored this intersection between the military and society.

In his study of logistical catastrophes, Manuel de Landa is preoccupied with logistics as a war machine. According to de Landa, the military sought a rationalisation of labour, 'beginning in early nineteenth century armories and culminating a century later in the time-and-motion studies and scientific management theories of Frederick Taylor, the product of his experiences in US arsenals'.¹⁹ De Landa notes: 'To lessen its dependence on manpower, the military increasingly effected a transference of knowledge from the worker's body to the hardware of machines and to the software of management practices.'²⁰ Within the context of capitalist globalisation, however, the 'command structure' of logistics is not tied to theatres of war or the military-industrial complex in any exclusive manner. Nonetheless, de Landa's observation here remains relevant. The transfer of knowledge from labour to machines and code results in workers within the logistical industries having a segmented, compartmentalised and often partial understanding of how supply chains are composed and the effects disruption or blockages in one part of the distribution system may have elsewhere. A comprehension of how supply chains operate may enable forms of political organisation and cross-sectoral modes of workers' solidarity.

Already available social media networking software such as Facebook or Twitter might be one option that facilitates political knowledge on the part of workers of integrated supply chains. But these software systems are designed primarily for chatting, even if we have seen them used to mobilise political populations, as was the case with the Arab Spring and the Occupy movement. The

more informal sectors of logistics industries rely on such software to manage their own supply chain operations. But they face a protocological barrier when informal supply chains meet the computational architecture of the world's dominant logistical software developers: SAP, Oracle, Infor, MS Dynamics AX, Descartes Systems Group, to name some of the leading players. Either way, the capacity to remodel parameters of proprietary logistics software packages is out of the question and existing social media software will lock workers into silos of Friends and Groups. Both are insufficient for workers seeking a comprehensive overview of logistical operations.

The materiality of communication technology and transport infrastructure provide key sites from which to begin assembling a political knowledge of logistics organised in part through algorithmic architectures. Such an analytical focus involves studying not just the infrastructure of logistics and the ways subjectivity is produced. It also includes a study of how logistics organises labour as an abstraction within the parameters of software. Modelling these spaces and operations within the genre of a serious video game provides an experimental sandbox to articulate conditions that otherwise manifest as disconnected, discrete sectors within global supply chains.

The logistical university is another sector increasingly enmeshed in the smooth-world fantasy of just-in-time services and education commodities delivered within informatised institutional settings and across the world's network of providers and consumers. The penultimate technocratic fantasy within the logistical university is to manage labour away from annual performance reviews, which everyone knows full well are a gestural exercise amounting to vague affirmation of the managerial apparatus and its primary persona: the knowledge manager.²¹ The logistical technocrat extends the meddling reign of the knowledge manager (whose earlier incarnation was the organisation man), seeking to measure the productivity of labour through software that provides ongoing feedback of activity, review and command within real-time systems of measurement.²²

In a recent column in the *London Review of Books*, Will Self reminisced about the 'large resident population of evil archetypes' that inhabited many of video games he played in his youth.²³ In the case of *Logistical Worlds*, that character is filled less by humans and more by communication machines, organisational systems and

algorithmic processes related to techniques of governance. The logistical technocrat is not the epicentre of control so much as its earnest functionary. Frequently fragile and inept, the logistical technocrat requires their own real-time measures of reassurance and appraisal. The primary trade of the logistical university becomes organised less around the delivery of educational services and products, and more aligned with the economy of big data. Here, we begin to see a continuum across the aggregation of data and its commercial exchange mastered by social media network corporations such as Facebook, the back-end maintenance of client's data operations by ERP software providers such as Germany's world-leading company SAP, the United State's National Security Agency and its PRISM data surveillance program, and the use of customer relationship management (CRM) software by universities keen to supplement their student-fee-driven economies with the prospect of data goldmines open for transaction with undisclosed third party clients. Welcome to the economy of 'lifestream logistics'. For Soenke Zehle, lifestream logistics 'include the datascares generated by our modes of communicative relation and the network architectures that sustain them'.²⁴ As biolinguistic and affective technologies of capture, lifestream logistics subsume living labour within patent-protected clouds of control.

—GAME AS METHOD

The development of a video game can also shape the design of research methods for a project interested in the study of transnational circuits of labour, life and infrastructure special to logistics and supply chain capitalism. Far from enthralled by the prospect of the lone theorist strapped to their keyboard, nor enticed by the anthropologist spending extended time in the field, we found ourselves having to take seriously the problem of method within university settings that no longer support the possibility for either of these intellectual personas, even if they were desirable. Certainly within the accelerated technocratic culture that defines much of the higher education sector, the time of thought is secondary to the generation of publications and external funding whose registration as 'research quantum' in annual performance databases and spreadsheets determine the calculation of research workloads. With highly compressed economies of academic production there is a certain default rationale of institutional survival that attends the decision

to undertake collective forms of research. This is especially the case for large-scale transnational projects in which partial knowledge defines for many the situation of encounter.

Accompanying this social dimension to collective modes of knowledge production is a media arrangement that integrates our world of experience with technologies of calculation.²⁵ Just as cinema organised perception through the logic of genre coupled with the technics of light and sound, so the social ubiquity of the game interface informs the production of knowledge through the protocols of play. This is not to go down the formalist path of media continuity proposed by Lev Manovich, but rather to foreground how the properties and qualities special to media of communication prompt singular universes of possibility. McKelvey, Tiessen and Simcoe frame media of simulation as technologies of calculation:

The Internet is no longer a space primarily of communication, but of simulation. By simulation, we do not mean a reproduction of reality 'as it is out there', but rather a sort of reality-in-parallel, one that generates its own sets of tangible quanta and its own 'realities'-to-be-calculated.²⁶

When gameplay crosses with research practices in global logistics industries, the serious game *Phone Story* developed by Italian tech-critique outfit Molleindustria is a standout example of how games can register a critique of the dark life of technology consumption and production. Designed for smart phone devices, *Phone Story* is set across four stages of the manufacturing and supply chain process, making 'the player symbolically complicit in coltan extraction in Congo, outsourced labor in China, e-waste in Pakistan and gadget consumerism in the West'.²⁷ With its satirical depiction of Chinese factory workers leaping to their death, it was no surprise that the tactical media stunt of *Phone Story* was removed within hours of its release on Apple's App Store. Yet despite the efforts of *Phone Story* to connect the play of users to issues of ecological destruction and human rights abuse associated with smart phone supply chains, Sy Taffel notes that the capacity for action in ways that produce any substantive change remains highly circumscribed: 'The user may still be caught within the trap of representation.'²⁸

For *Logistical Worlds*, the scene of global supply chains, logistical processes, software control and labour conditions comprise the central elements around which play unfolds. How this ensemble of relations will serve as the backdrop for play

more specifically is a narrative yet to be decided. More significant is the relation between the game as a conceit for the collection of data on labour conditions and logistical operations in order to enhance users' gameplay and the game as interface for target audiences and players from corporate, union and activist sectors.²⁹ Needless to say, it is possible to reflect on how the game as a medium of expression might feed into the method of researching aspects of supply chain capitalism. New York media theorist Alexander Galloway goes so far as to say we are now in a period of 'ludic capitalism'—an economy of play—that fuses the poetry of romanticism and the design of cybernetic systems theory as a 'juridico-geometric sublime' whose online interfaces extract value from our labour of play.³⁰ Galloway's allegory of protocological control manifest in computer interfaces is suggestive of how the aesthetic events of multilayered data can 'reveal something about the medium and about contemporary life'.³¹ Just when you might have thought that theory these days was all about non-representational relations and post-human agency, we see here a return to the problem of representation and hermeneutics, where code is the new grammar awaiting interpretation.

Without a doubt there is importance in the critical capacity to read the correspondence between the programmer's language of code and its shaping effects on social, cultural and economic life—or what Galloway, in dialogue with Wendy Hui Kyong Chun, refers to as functionality embedded in software and ideology.³² But in studying global logistical industries, much of the software used to manage supply chains and the mobility of people and things is beyond the reach of the critical theorist. As mentioned earlier, the software developed by companies such as SAP and Oracle are under proprietary control and are highly expensive.³³ Even with knowledge of programming, it is far from straightforward to get a look under the hood. Moreover, the data generated on logistical operations related to supply chain management, procurement, warehousing and labour productivity from this software is commercially valuable information and therefore far from easy to incorporate into the parameters of a game. In the absence of code as a discernible thing, the materiality of transport and communications infrastructure found in the logistical city offer some contours of reference to design how algorithmic architectures govern much of labour and life.

In many respects the logistical industries that drive supply chain capitalism already present themselves as a game to the millions who work in transport, communications, warehousing, procurement and ports—all of which comprise the key infrastructural sites of the logistical city. The logistical city is a city of peripheries. These peripheries are occupied by intermodal transport terminals, warehouses, IT infrastructure, container parks and shipping ports. Such logistical facilities do not stand isolated, of course, but are interspersed with suburbs, green belts, roads, railways, water systems and barren land. The interconnection of peripheries on a transnational scale makes up a special kind of globality, in which the complex network of distribution systems—roads, rail, shipping, aviation—makes concrete the otherwise mysterious abstractions of capitalist operations. Yet for all this materiality, the logistical city goes largely unnoticed in the metropolitan imaginary precisely because the margins of cities tend to be overlooked and made invisible by more spectacular elements—magisterial feats of architecture, harbour views, cultural festivals and so forth. We long ago resigned ourselves to not needing to know how things work or where things come from. And we are in no rush for a reminder. The logistical city ticks along in the background as we get on with our busy daily lives.

While the logistical city traverses the outskirts of urban spaces, it is not suburban *per se* since it is nestled between and beyond residential zones. The logistical city is distinct from the global city, which is characterised by financial services located in CBDs and cosmopolitan populations whose ethnic peculiarities are integrated more or less seamlessly into the flow of global economies. The logistical city also differs from the industrial city, which is defined by class stratifications across urban spaces and an economy based on the manufacturing of goods. Like the global city, the logistical city is a city of services, but these services are driven by computational systems oriented around managing the mobility of things produced by the industrial city. Servicing the services of the global city, the logistical city is one whose borders are porous and elastic. Scale is calibrated according to real-time systems of measure and performance special to just-in-time regimes of labour productivity and commodity assemblages. Composed with infrastructure that is frequently coded and managed by computational systems, the

logistical city can be understood as something akin to what Rob Kitchin and Martin Dodge call 'code/space' in which 'software and the spatiality of everyday life become mutually constituted'.³⁴ In developing *Logistical Worlds* our interest in the digital coding of space is more specifically around how labour is managed and how subjectivities are produced when the time of life and action of bodies is increasingly overseen and regulated by computational systems of control and regulation.

Thirty years ago the LA School of Urbanism—a loose collection of planners, geographers, sociologists and historians—identified many of the features of the logistical city just described, especially 'the emergence of information-age "edge cities", and the hypermobility of international capital and labor flows', as recounted by Steven Erie in his book *Globalizing L.A.: Trade, Infrastructure and Regional Development*.³⁵ The logistical city nevertheless stands out as a new urban form for the ways in which it stitches together diverse cities and regions across the global north and south, continuously reconfiguring connections according to just-in-time demands of supply chains and contingencies that disrupt their smooth operation. Whenever a new diagram of relations is set into play, a new logistical world is created in which difference must either be displaced or absorbed. This spatio-temporal elasticity and capacity to adapt to changing conditions is perhaps what marks the logistical city as particularly distinct from other urban forms. Always searching for enhanced efficiencies across its circuits of distribution, the logistical city is an urban laboratory ripe in experimentation.

The logistical city can also be understood in terms of what architect Reinhold Martin calls an 'organizational complex', which consists of technocratic and aesthetic systems designed to modulate the world as 'an organized, informatic pattern' in flexible ways.³⁶ Not constrained by sovereign rule or national borders, the logistical city is a recombinatory form that attempts to standardise capital accumulation from the micro level of algorithmic apparatuses to the macro level of global infrastructures. Standards are crucial to the universal logic of interoperability across software platforms and infrastructural components. Without them, cargo containers could not transfer with such ease from ship to truck, software operating systems could not exchange data across platforms, and circuit boards could not be manufactured to fit and function in multiple computational devices.

Whoever sets the standard rules the world. Yet standards change and develop over time. New standards are always being established, though only some percolate to the top and become universally adopted. This is where innovation meets political economy. The desire for a trans-scalar smooth world, however, is accompanied by any number of contingencies: labour strikes, software glitches, inventory blowouts and traffic gridlock, to mention just a few that come to mind. In principle, the topological parameter of 'fault tolerance' incorporates such disruptions to make anew the seamlessness of logistical worlds. But there can be no denying that contingency is the nightmare of logistics.

Logistical nightmares can be found across the cities investigated in the Transit Labour project, which examined how circuits of labour are reshaping the contours of regions while coming up against, testing and transforming a multiplicity of borders. Rajarhat New Town is a development underway since the late 1990s on the north-east fringes of Kolkata, situated between the airport and on the edge of Sector V, an IT park developed in the 1970s as an industrial extension of Kolkata's Salt Lake township. The government legislation that authorised both these developments is complex and fraught with political conflicts and social tensions. Chief among these was the West Bengal Housing Infrastructure Development Corporation's (HIDCO) invocation of a colonial administrative remnant, the Land Acquisition Act of 1894. When combined with a China-inspired neoliberal legislation, the Special Economic Zone (SEZ) Act of 2005, HIDCO was able to legally conjure a zoning technology for Rajarhat designed to attract foreign capital to finance the transformation of fertile agricultural land and fisheries into non-agricultural use. The economic and social displacement of peasant populations numbering in their tens of thousands recalls for Ranabir Samaddar and his colleagues at the Calcutta Research Group the Marxian critique of 'primitive accumulation', or what David Harvey prefers instead to term 'accumulation by dispossession'.³⁷ In the case of Rajarhat, the expropriation of land and the partial remobilisation of peasant labour forced by HIDCO into 'service villages' are the conditions of possibility for the logistical city and its information economy.

Following an initial surge which saw the instalment of fibre-optic cable and a skeletal road system, a number of international and national IT firms opened for business in Rajarhat, including Wipro, Accenture, Unitech, IBM and Tata Consultancy

Services. Graduates of computing and IT programs working in these firms are largely undertaking beta-testing of new software or business process outsourcing (BPO) work, doing basic data entry and accounting tasks for financial, medical and insurance companies based in Europe and North America. It is worth noting that a logistical city like Rajarhat registers an uneven geography of information that goes one step beyond the international division of labour running along the global north and south axis. Most of the IT-related work in Rajarhat, as well as Sector V, is a secondary form of outsourcing internal to the nation state. Parent firms based in Mumbai, Chennai, Bangalore and Hyderabad undertake the more interesting research and development and management-related work, while IT workers with similar qualifications are lumped with menial informatic tasks.

With India's elevation in these sorts of high-skill sectors of the information economy, it is hard not to assume a substantial loss of similar jobs in the global north accompanying forms of outsourcing internal to the space of the nation within India. In Australia in 2013, we have heard much about how the aviation and finance industries are also planning to outsource data-entry and general service-related work. Whether it is on a global or national scale, the key driver behind these decisions is, of course, the lower cost of labour coupled with cheaper land leases for IT service firms located on the peripheries. And this is where logistical cities such as Rajarhat find their rationale for existence. Since 2008, however, the rate of development in Rajarhat has slowed considerably because of the global financial crisis. Partially built apartment towers stand isolated against a backdrop of now arid land dotted with surveyor's pegs and the occasional grazing cattle. Many of the complete residential complexes remain empty as investment owners are located in other Indian cities or live overseas. A number of IT firms are operating, but their workers often commute from elsewhere in Kolkata, as do many of the owners of the makeshift teahouses and eateries servicing the IT workers during their breaks. As Ishita Dey's research has made clear, some of the women find employment as domestic labourers, but for most of the men security and construction work is considered semi-skilled and usually contracted out to migrant workers who live elsewhere in India.³⁸ Following some initial work filling in the wetlands, this only leaves low-skill construction jobs and teahouses as sources of income for men. No wonder, then, that Rajarhat New Town is the scene of regular acts of infrastructural

sabotage, social unrest and political conflict. Not only is the logistical city distant from metropolitan imaginaries, it suffers the intrusion of materiality in ways that unsettle the abstraction of information.

The logistical city is also at the cutting edge of labour reform. Technologies of automation are transforming shipping ports across Australia and elsewhere in the world, shifting the work of wharfies from the dockside to the screen where the oversight of robotic operations is duplicated by human labour clicking through the interface of software applications. Whether machine or flesh, performance indicators are finely calibrated against time and volume. The logistical city does away with the biological and social rhythms of urban life so beloved by Henri Lefebvre, and instead operates by the cold sword of code that measures productivity and worth in real-time.³⁹ The logistical city is caught between expediency and contingency. The machine dream of absolute efficiency runs counter to the unruliness of labour and life. The elasticity of logistical time and space must nevertheless contend with the materialities of society and place, particles and power. Even if the logistical city could overcome the protocological asymmetries across software platforms that prevent cross-sector and global interoperability, it could never entirely eradicate the constituent power of refusal. The logistical city is cold, and without employment. The work has been done, elsewhere, sometimes hundreds if not thousands of kilometres away.

—LOGISTICAL TIME, OR, CALCULATIONS OF PERFORMANCE

Logistics robs living labour of time. At the level of labour management, logistics registers the calculation of time against the performance of tasks and movement of things. This is where Marcel Mauss's techniques of the body and related early twentieth-century studies in body-motion and their technologies of capture (principally the chronophotography of Etienne-Jules Marey) provide the preconditions for labour efficiencies—or what Anson Rabinach terms a 'physiognomy of labour power'—in industrial and, later, informational market economies.⁴⁰ More recently, Jonathan Crary has diagnosed the 'injuring of sleep' by the rapacious force of capitalism.⁴¹ The 24/7 just-in-time, flexible mode of capital accumulation critiqued by Crary is coincident with the real-time regime of logistics managed through ERP software interfaces. How does one play against the all-

pervasive temporality of logistical regimes? And to recast Crary, how does the society of living labour protect and defend itself when logistical time externalises 'the individual into a site of non-stop scrutiny and regulation'?⁴² Within the space of warehouses and transport industries, the movement of workers is increasingly regulated by global positioning system (GPS) vehicle tracking, radio-frequency identification tags that profile workers within database time and voice-directed order picking technologies 'that manage the passage and pace of workers through the workplace with the aim of maximising efficiencies'.⁴³ The automated coordination and control of workers results in higher levels of productivity accompanied by increased demands and pressures upon the labouring body. Such technologies of governance correspond with the rise of what I would term 'informatised sovereignty', which takes on particular hues in logistical techniques associated with transportation industries. Code is King.

ERP databases are standard platforms used within logistics in combination with customised software applications to manage global supply chains, organisational conditions and labour efficiencies. KPIs are software interfaces built into ERP databases to measure worker and organisational efficiencies, meeting of target quotas, financial performance, real-time status of global supply chains, and the capacity of the organisation to adapt to changing circumstances. These are all quantitative indicators that register performance with a numerical value, however, and are not able to accommodate more immaterial factors such as a worker's feelings and level of motivation and enthusiasm. It would seem logistics software is still to address the biological spectrum special to the species-being of human life. Yet, in another sense, such immaterialities of labour and life are coded into the quantitative parameters of KPIs through the brute force of instrumentality or calculation: no matter how a worker might feel, quotas have to be met and global supply chains must not be adversely affected.

The coded materiality of fulfilling performance quotas and ensuring the smooth operation of supply chains subsists within its own universe of auto-affirmation. The relationship between logistics software and self-regulation by workers assumes closure in the circuit of governance. An operator working in the logistics of new and second-hand equipment transportation for a Shanghai-based US automotive company put it this way: 'As per our broker's management experience, every staff is

trained to use their internal ERP software to reflect every movement of their work. Moreover, the data from ERP software is also used as a tool or KPI to evaluate staff's performance, thus making them work more efficiently.⁴⁴ This ready inculcation of both disciplinary practices and the logic of control within the organisational culture of the company and its workers is quite confronting. Certainly, the managerial culture of universities has more than its share of whacky acronyms that constitute a new planetary grammar coextensive with the governance of labour. And the bizarre interpellation of academics into the pseudo-corporate audit regimes predicated on performance outcomes and accountability measures presents some novel terrain for theories of subjectivity and desire. The industry of logistics further amplifies such biopolitical technologies, where the labour control regime is programmed into the logistics chain at the level of code. A 'standard operation procedure' (SOP) is incorporated into the KPI of workers.⁴⁵ The SOP describes the status of specific job, dividing it 'into measurable control points'. My informant in Shanghai provided this example: 'For instance, we would set SOP to our broker, which may require them to finish custom clearance of a normal shipment within three working days, if they fail to hit it, their KPI will be influenced and thus influence their payment.'⁴⁶

There is a sense here of how logistics software internalises the movement of labour as the fulfillment of assigned tasks over a set period of time. This sort of labour performance measure is reproduced across many workplace settings. What makes it noteworthy here is how the governance of labour is informatised in such a way that the border between undertaking a task and reporting its completion has become closed or indistinct. Labour and performativity are captured in the real-time algorithms of code. With the rise of informatised sovereignty, biopolitical control is immanent to the time of living labour and labour-power.⁴⁷ There is no longer a temporal delay between the execution of duties and their statistical measure. The following account describes the use of ERP software to evaluate the KPIs of workers:

Each employee is asked to mark it in the ERP system when they finish their required work. There are two advantages for it: 1) If they fail to finish the logistics activity within SOP time, they check in the ERP system to find which employee did not complete his/her time according to SOP, which help measure employee's performance. 2) Every employee could track in the ERP system to know about the current status/movement of the

logistics activities. In short, ERP software visualizes the movement of logistics activities by efforts of every link in the logistics chain.⁴⁸

If ERP software were a game interface, one counter-challenge for the worker-as-player would be to score against time-based performance measures and the visibility of movement. But as noted earlier, ERP software is a quantitative system, and as a closed cybernetic model it refuses the feedback or noise of more immaterial forces such as worker's attitudes, feelings and levels of motivation that would have disruptive effects.⁴⁹ Although a more sophisticated software environment would calculate in such variables precisely because their modulating power operates in a replenishing way, such is the parasitical logic of capital and the organic *modus operandi* of life. As it stands, the metaphor of global supply chains signals a totalising vision in which everything can be accounted for, measured and ascribed an economic value. Yet as Sandro Mezzadra and Brett Neilson note in their recently published book, *Border as Method*, 'the notion of the chain, though it carries a sense of ligature or bondage that should not be discounted or diminished, suggests the linkage or articulation of multiple units into a single linear system'.⁵⁰

In the case of logistics, there is an institutional, discursive and political-economic investment in securitisation and risk assessment that underscores the need for such linear systems of control. Linearity and closure are always going to be the undoing for a system that rests on stasis, consistency and control without incorporating contingency and complexity that define the 'far-from-equilibrium' conditions of life-worlds as understood in more advanced cybernetics.⁵¹ As we have been reminded in countless news media reports on the global financial crisis, all limits or failures of capital present new opportunities for its ongoing reproduction. The algorithmic mining of big data is just one of various horizons of acquisition for capital in its tireless movement. The extent to which standards determine the mobility of people, finance and things can be registered, in part, through a study of global infrastructures of transport and communication. My interest in this article has been to ask how the design of a video game can contribute to such analytical and, perhaps occasionally, political work.

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—NOTES

¹ Anna Tsing, 'Supply Chains and the Human Condition', *Rethinking Marxism*, vol. 21, no. 2, 2009, pp. 148–76.

² The Australian Research Council (ARC) funded project (DP0988457), 'Transit Labour: Circuits, Regions, Borders', undertook a collective study in Shanghai, Kolkata and Sydney of the relation between labour mobilities and logistical industries. See <<http://transitlabour.asia>>. Tracking Chinese imperialism through infrastructure, the project continues its study of global logistics industries in Greece, Chile and India with a recently awarded ARC Discovery Project (DP130103720), 'Logistics as Global Governance: Labour, Software and Infrastructure along the New Silk Road' (2013–2016). This new project will develop a video game as part of its research method and dissemination strategy.

³ See Foldoc: Free On-Line Dictionary of Computing, <<http://foldoc.org/>>. Within object-oriented design and programming, formal generic parameters may be accompanied by a class of arbitrary types: 'A routine may have formal arguments, representing values which the routine's clients will provide in each call. The literature commonly uses the term parameter (formal, actual) as a synonym for argument (formal, actual). There is nothing wrong in principle with either term, but if we have both routines and genericity we need a clear convention to avoid any misunderstanding. The convention will be to use "argument" for routines only, and "parameter" (usually in the form "generic parameter" for further clarification) for generic modules only'. Bertrand Meyer, *Object-Oriented Software Construction*, 2nd edn, ICE Inc., Santa Barbara, 2000, p. 96. Thanks to Yuk Hui for his guidance here.

⁴ See Julian Kücklich, 'Seki: Ruledness and the Logical Structure of Game Space' in *Logic and Structure of the Computer Game*, eds Stephan Günzel, Michael Liebe and Dieter Mersch, DIGAREC Series 4, Potsdam University Press, Potsdam, 2010, pp. 36–56.

⁵ For a statement on collective research methods that also includes a critique of social theories of digital methods, see Anja Kanngieser, Brett Neilson and Ned Rossiter, 'What is a Research Platform? Mapping Methods, Mobilities and Subjectivities', *Media, Culture & Society*, forthcoming 2014.

⁶ Such an understanding of topology, sociality and knowledge production shares something with the notion of topological space and time as the conjoining of difference through the relationality of borders within spatio-temporal dynamics understood as intrinsic as distinct from extrinsic. See Celia Lury, Luciana Parisi and Tiziana Terranova, 'Introduction: The Becoming Topological of Culture', *Theory, Culture & Society*, vol. 29, no. 4–5, 2012, pp. 3–35. It also privileges an empiricist process of concept production, as outlined in Scott Lash's proposition of topological operations of space and time as *a posteriori* (empiricist) rather than *a priori* (rationalist). See Scott Lash, 'Afterword: In Praise of the *A Posteriori* Sociology and the Empirical', *European Journal of Social Thought*, vol. 12, no. 1, 2009, pp. 175–87. A conceptual affiliation could also be drawn between topology and mediation as developed by medium theorists such as Harold Innis who hold an interest in how the material properties of communications media and transport technologies shape time and space.

⁷ Fenwick McKelvey, Matthew Tiessen and Luke Simcoe, 'We are What We Tweet: The Problem with a Big Data World when Everything You Say is Data', *Culture Digitally: Examining Contemporary Cultural Production*, 3 June 2013, <<http://culturedigitally.org/2013/06/we-are-what-we-tweet-the-problem-with-a-big-data-world-when-everything-you-say-is-data-mined/>>. Such scenarios of digitally modulated social control are reminiscent of a raft of science-fiction stories (think J.G. Ballard and Phillip K. Dick) along with the advertising and political campaign strategies devised by Edward Burneys and his team of public relations consultants. See Adam Curtis's documentary, *The Century of the Self* (2002) and Brian Holmes, 'Neolib Goes Necon: Adam Curtis, or Cultural Critique in the 21st Century', 25 June 2007, <<http://brianholmes.wordpress.com/2007/06/25/neolib-goes-neocon>>.

⁸ McKelvey, Tiessen and Simcoe.

⁹ Brian Holmes, 'Future Map: Or, How the Cyborgs Learned to Stop Worrying and Love Surveillance', *Continental Drift*, 9 September 2007, <<http://brianholmes.wordpress.com/2007/09/09/future-map>>.

¹⁰ Nick Dyer-Witheford and Greig de Peuter, *Games of Empire: Global Capitalism and Video Games*, University of Minnesota Press, Minneapolis, 2009, p. 213.

¹¹ Dyer-Witheford and de Peuter, p. 213.

¹² William H. Whyte, *The Organization Man*, University of Pennsylvania Press, Philadelphia, 2002 (1956). On the topic of grey literature, I am thinking of the work on intellectual property, postal records and archives by Esther Milne, 'The Archive: Informality and Intellectual Property', *Data, Memory, Territory*, Digital Media Research, no. 1, November 2012, pp. 25–7.

¹³ Matthew Fuller and Andrew Goffey, *Evil Media*, MIT Press, Cambridge MA, 2012, pp. 135–6.

¹⁴ For an example of such a gloomy extrapolation of contemporary trends, see Jonathan Zittrain, *The Future of the Internet—And How to Stop It*, Yale University Press, New Haven and London, 2008. Needless to say, such an explicit exaggeration of contemporary trends is not meant to obscure the many creative uses to which such infrastructures have been put, or deny that corporate and military infrastructures can also provide public goods, but to counter the unbearable evangelism of decentralisation-as-democratisation. As Benkler notes: ‘For the first time since the industrial revolution, the most important inputs into the core economic activities of the most advanced economies are widely distributed in the population. Creativity and innovation are directly tied to the radical decentralization of the practical capability to act, on the one hand, and of the authority to act, on the other. The critical policy questions of the networked environment revolve round the battles between the decentralization of technology and the push of policy to moderate that decentralization by limiting the distribution of authority to act.’ Yochai Benkler, ‘For the First Time Since the Industrial Revolution’ in *The Tower and The Cloud: Higher Education in the Age of Cloud Computing*, ed. Richard N. Katz, EduCause, Boulder, CO, 2008, p. 52, <<http://www.educause.edu/thetowerandthecloud>>. This footnote and the sentence to which it refers is taken from Ned Rossiter and Soenke Zehle, ‘Acts of Translation: Organized Networks as Algorithmic Technologies of the Common’ in *Digital Labor: The Internet as Playground and Factory*, ed. Trebor Scholz, Routledge, New York, 2013, pp. 225–39.

¹⁵ Patrick Crogan, *Gameplay Mode: War, Simulation and Technoculture*, University of Minnesota Press, Minneapolis, 2011.

¹⁶ Crogan, pp. xxi, xxi. On the shift within the US military from the state-centred doctrine of mutual deterrence to more dispersed strategies of pre-emption designed to anticipate biological contagion, network terrorism and insurgency, and finance capitalism, see also Melinda Cooper, ‘Pre-empting Emergence: The Biological Turn in the War on Terror’, *Theory, Culture & Society*, vol. 23, no. 4, 2006, pp. 113–35.

¹⁷ Philipp von Hilgers, *War Games: A History of War on Paper*, trans. Ross Benjamin, MIT Press, Cambridge, MA, 2012, p. 32.

¹⁸ *Ibid.*, p. 31. The militarisation of civil society is a thesis spread across the writings of Paul Virilio, and informs much of Crogan’s argument. Arguably logistics in post-World War II settings are no longer beholden to, or progeny of, military operations in the first instance and obscures what Brett Neilson notes as ‘the sense in which logistics has actively formed a new terrain of politics on which struggles are and will continue to be played out’. Think, for instance, of any number of labour struggles arising along global supply chains, border disputes around migration, food contamination, faulty commodities, consumer backlash against child workers assembling electronic goods or working in severe conditions. Such examples all stem from logistical operations. We could even include privacy debates emerging around the use of data generated within workplace settings or out of daily social media practices. See

Brett Neilson, 'Five Theses on Understanding Logistics as Power', *Distinktion: Scandinavian Journal of Social Theory*, vol. 13, no. 3, 2012, p. 324.

¹⁹ Manuel de Landa, *War in the Age of Intelligent Machines*, Zone Books, New York, 1991, p. 106.

²⁰ *Ibid.*, p. 106.

²¹ For an account of the rise of this persona, see Christopher Newfield, *Unmaking the Public University: The Forty Year Assault on the Middle Class*, Harvard University Press, Cambridge, MA, 2008, p. 129.

²² Such is the view of some executives of a company providing cloud software to universities. See Kristi Erickson, 'Continuous Feedback: It May Be a Better Approach Than the Annual Review', *TLNT: The Business of HR*, 22 August 2012, <<http://www.tlnt.com/2012/08/22/continuous-feedback-it-may-be-a-better-approach-than-the-annual-review/>>.

²³ Will Self, 'Diary', *London Review of Books*, vol. 34, no. 21, November 2012, p. 46.

²⁴ Soenke Zehle, 'The Autonomy of Gesture: Of Lifestream Logistics and Playful Profanations', *Distinktion: Scandinavian Journal of Social Theory*, vol. 13, no. 3, 2012, pp. 341–54.

²⁵ There is some parallel here with what Jussi Parikka terms 'medianature'. See Jussi Parikka, 'New Materialism as Media Theory: Medianatures and Dirty Matter', *Communication and Critical/Cultural Studies*, vol. 9, no. 1, 2012, pp. 95–100, 'Insects and Canaries: Medianatures and the Aesthetics of the Invisible', *Angelaki: The Journal of Theoretical Humanities*, vol. 18, no. 1, 2013, pp. 107–119 and the edited collection, *Medianatures: The Materiality of Information Technologies and Electronic Waste*, Living Books about Life, Open Humanities Press, 2011, <<http://www.livingbooksaboutlife.org/books/Medianatures>>.

²⁶ McKelvey, Tiessen and Simcoe.

²⁷ <<http://www.phonestory.org/>>.

²⁸ Sy Taffel, 'Scalar Entanglement in Digital Media Ecologies', *NECSUS: European Journal of Media Studies*, no. 3, Spring 2013, <<http://www.necsus-ejms.org/scalar-entanglement-in-digital-media-ecologies/>>.

²⁹ Thanks to Sean Dockray for part of this phrasing.

³⁰ Alexander R. Galloway, *The Interface Effect*, Polity, Cambridge, 2012, pp. 28–9.

³¹ *Ibid.*, pp. 44–5.

³² Galloway, 'Software and Ideology', in *The Interface Effect*, pp. 54–77.

³³ For one of the few critical studies that takes an STS, ethnographic approach, see Neil Pollock and Robin Williams, *Software and Organisations: The Biography of the Enterprise-Wide System or how SAP Conquered the World*, Routledge, Oxford and New York, 2008. Readers of German may wish to consult the organisation and management studies analysis of SAP by Brita Hohlmann, *Organisation SAP: Soziale Auswirkungen technischer Systeme*, PhD thesis, University of Darmstadt, 2007.

³⁴ Rob Kitchin and Martin Dodge, *Code/Space: Software and Everyday Life*, MIT Press, Cambridge, MA, 2011, p. 16.

- ³⁵ Steven P. Erie, *Globalizing L.A.: Trade, Infrastructure and Regional Development*, Stanford University Press, Stanford, 2004, p. 205.
- ³⁶ Reinhold Martin, *The Organizational Complex: Architecture, Media and Corporate Space*, MIT Press, Cambridge, MA, 2003, p. 10.
- ³⁷ Ranabir Samaddar, 'Rajarhat, the Urban Dystopia', *Transit Labour: Circuits, Regions, Borders*, no. 3, August, 2011, pp. 14–6, <<http://transitlabour.asia/documentation/>>. See also Ishita Dey, Ranbir Samaddar and Suhit K. Sen, *Beyond Kolkata: Rajarhat and the Dystopia of Urban Imagination*, Routledge, New Delhi, 2013; David Harvey, *The New Imperialism*, Oxford University Press, Oxford, 2003.
- ³⁸ Ishita Dey, 'New Town and Labour in Transit', *Transit Labour: Circuits, Regions, Borders*, no. 3, August 2011, pp. 10–13, <<http://transitlabour.asia/documentation/>>.
- ³⁹ Henri Lefebvre, *Rhythmanalysis: Space, Time and Everyday Life*, trans. Stuart Elden and Gerald Moore, Continuum, London and New York, 2004.
- ⁴⁰ Rabinach, cited in Reinhold Martin, p. 17.
- ⁴¹ Jonathan Crary, *24/7: Late Capitalism and the Ends of Sleep*, Verso, London, 2013, p. 18.
- ⁴² *Ibid.*, p. 32.
- ⁴³ Anja Kanngieser, 'Tracking and Tracing: Geographies of Logistical Governance and Labouring Bodies', *Environment and Planning D: Society and Space*, vol. 31, no. 4, 2013, p. 601.
- ⁴⁴ Email interview, Shanghai, 30 May 2009.
- ⁴⁵ Standard operation procedure also refers, of course, to the routine practices of torture adopted by the US military, supposedly as a technique of interrogation. The shared terminology here should come as no surprise, given the origins of logistics within the military-industrial complex.
- ⁴⁶ Email interview, Shanghai, 31 May 2009.
- ⁴⁷ See also Tiziana Terranova: 'What we seem to have then is definition of a new biopolitical plane that can be organized through the deployment of *immanent control*, which operates directly within the productive power of the multitude and the clinamen.' *Network Cultures: Politics for the Information Age*, Pluto, London, 2004, p. 122.
- ⁴⁸ Email interview, Shanghai, 31 May 2009.
- ⁴⁹ Since logistics software operates as a closed environment that does not accommodate feedback as a correctional process through the modification of form, it is not properly a cybernetic system, as developed by Norbert Wiener in his book *Cybernetics; or, Control and Communication in the Human Animal and the Machine*, MIT Press, Cambridge, MA, 1948. As Reinhold Martin notes in his account of Wiener's work on cybernetics, "The second law of thermodynamics [which Wiener drew on in his study of 'systems of information measurement and management'] holds that the overall level of entropy, or disorder, tends to probabilistically to increase in any closed system'. It is in this respect, that one wonders how logistics does not break down into frequent chaos. See Martin, p. 21.

⁵⁰ Sandro Mezzadra and Brett Neilson, *Border as Method, or, the Multiplication of Labor*, Duke University Press, Durham, 2013, p. 95.

⁵¹ See Terranova, p. 122. See also Ned Rossiter, *Organized Networks: Media Theory, Creative Labour, New Institutions*, NAI Publishers / Institute of Network Cultures, Amsterdam, 2006, pp. 166–95.