The Architecture of Logistics

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Introduction

The Architecture of Logistics: Trajectories Across the Dismembered Body of the Metropolis

Negar Sanaan Bensi and Francesco Marullo, editors

Neoliberalism is a many-headed monster. It can hold different drives without altering its internal coherence. It grows through crisis and instability. Within its flexible order, drastically opposite forces are able to coexist and mutually stimulate each other: globalisation expands at the same pace as nationalist and populist movements; the circulation of people increases alongside the intensification of migratory policies; shared economies and collaborative consumption develop apace with the multiplication of copyrights and patents; common knowledge and resources proliferate as does the parasitism of private entrepreneurship.

Integrating differences within a homeostatic system of economic competition, the monster of neoliberalism turns whatever it devours into commensurable and exchangeable quantities. Any equivalence becomes possible. Any juxtaposition becomes profitable. Any connection becomes valuable. However, the further this dismembered body enlarges, while assimilating new forces and exchanges, the more it needs to improve logistics, or its nervous and circulatory system to stay alive: boats, containers, trucks, warehouses, department stores, harbours, train yards, airports, cargo terminals, communication centres, satellite stations, and all the material conditions that improve flux and trade while ensuring the integrity of commodities across its distant limbs. This issue of *Footprint* meditates on logistics and its architecture of exchange as the essential lymph of neoliberalism. Registering and managing the circulation of people, goods and information across the planet, the architecture of logistics could be considered the litmus paper from which one could read and understand territories, populations and societal assemblages.

The term 'logistics' derives from the Greek verb *logizomai* meaning to calculate, to reckon, to organise rationally, to *plan*. As first systematised by Antoine-Henri Jomini and Carl von Clausewitz in the early nineteenth century, logistics deals not only with the organisation of armies and supplies on a battlefield but with everything necessary for reducing friction in the actualisation of a strategy. Over time the military knowledge of logistics was reformulated as a technology of governance, to modulate trade relations and organise territories in peace time as well. In the aftermath of World War II, logistics turned the whole world into a smooth surface for exchange: into a unique 'floor' for production.[1] Containerisation, intermodal freight transport, and outsourced manufacturing processes established a global infrastructural system that regularised the circulation of goods by undermining local labour relations, imposing standardised spatiotemporal frameworks and a whole new architecture: an architecture of logistics.

This phenomenon is indeed visible everywhere: as pallets and containers transformed the spatial configuration of harbours and terminals, by allowing traditional stevedoring and docking tasks

to become automated processes, so digital technologies and storage software developed the way commodities are measured, coded, and dispatched, progressively transforming warehouses to colossal semi-automated sheds entirely dependent on invisible algorithmic orders. Goods once stocked in various kinds of crates, barrels, and boxes are now packed and individually coded in orderly containers devoid of smell. Loading and unloading operations have been gradually mechanised and computerised to ensure overall control over the movements of any single object, without accident or physical strain.

And yet, despite often being labelled as an 'architecture without humans' because of the high level of technical automation, logistics does not only produce generic spatial configurations able to cope with constant variation and market fluctuations – like fulfilment centres, container terminals, or interchange yards – but it also creates specific forms of employment and new opportunities for workers' opposition and collective bargaining, as witnessed by the numerous strikes and demonstrations in recent decades. In this sense, the architecture of logistics inevitably replicates the very ambivalences of the monstrous creature it feeds, a tangle of invisibility and concreteness, instantaneous transactions and slow movements, international routes and local labour forces. A monster nurtured by its inner tensions: local duties and extra-territorial domains; migratory seasonal workers and banned unionisation; invisible barcodes and operators' fatigue; blind algorithms and colossal fulfilment centres; the technical evolution of vessels and the steady articulation of terminals; the accelerated transactions of finance and the lengthy stratification of cities.

This schizophrenic nature becomes evident in its spatial development, where its abstract procedures become immediately tangible. Trying to cope with the expanded field of trade and communication networks and the advancement of smart technologies and distribution, the architecture of logistics is often minimised to its barest and most efficient load-bearing structure: large-span shelters, space frames, cranes, automated floors and platforms. At the same time, the alluring promise of its fluid and freely accessible infrastructure is constantly negated by concrete factors such as territorial scale and encumbrance, land jurisdictions and insurance policies, free trade zones and customs, financial investments or oil and steel prices. Moreover, by mediating every exchange relation around the globe, the architecture of logistics not only reveals the distribution of wealth, financial and productive energies, but it also tracks territories and populations, indexing and capitalising upon their visceral forces and perversions, identities and subjectivities, fears and desires. Thus, gathering academic and review articles from researchers and emerging scholars in the field, the ambition of *Footprint 23* is to provide a critical survey of the architecture of logistics, unfolding the multivalences of its apparatus, dissecting its buildings and spaces, its technologies and labour relations, its historical evolutions as well as its future projections, along three main directions of inquiry.

The first trajectory attempts to define *what* logistics is and *how* it operates, focusing on the inherent ambivalence of its apparatus, able to cope with different scales and various temporal dimensions – from barcodes and gadgets to global routes and territorial infrastructures – constituting both a physical and abstract framework supporting, measuring and quantifying movements and actions, thoughts and desires. If logistics emerged as the art of war and computation, aiming at systematising differences, removing friction and smoothing contingencies, today it has developed both at the micro-scale of the gizmo and at the macro-scale of the global supply-chain, imposing a universal framework wherein every exchange transaction is bound to fit. On one side, drawing from Object

Oriented Ontology and specifically from Timothy Morton's notion of the hyperobject, Clare Lyster redefines logistics as a vast landscape of independent devices manifesting in various forms, or 'footprints', that impose specific spatio-temporal relations upon their users in order to extract information and process data. On the other side, Jesse LeCavalier's research demonstrates how logistics has become the organisational paradigm for mass distribution and consumption, which requires a necessary updating of the traditional understanding of the relations between signs, objects, buildings and infrastructures. Along the same line, photographing salient passages of the Californian Central Valley, Neeraj Bathia proposes to reconsider logistics as a constellation of specific surfaces, conduits, and containers. Reformulating Rosalind Krauss's diagram of the expanded field, these categories permit one to read and classify the emerging hybrid integration of natural resources, cities and artificial landscapes to conjecture future scenarios of intervention. Yet, this new expanded field is internally generated by tensions and anomalies that, for George Papam Papamattheakis, could also 'detour' the logistical apparatus. Against the homogeneity of quantity and automation of the logistic floor, Papamattheakis exalts the unpredictable conditions of the ground which can reinvigorate the idiosyncratic quality of places and communities and obstruct the isotropic dimension of circulation space.

The second trajectory investigates the way logistics penetrates our existences, not simply by affecting how we live and work but the way in which it provides the very possibility of life as such, or, in other words, how logistics is inherently political. By filtering and regulating essential provisions, opening or denying the accessibility to resources and territories, logistics transforms bodies into commodities and shapes life in all its expressions. Delving into the specific conditions of the Gaza Strip, Francesco Sebregondi develops an original reversal of the traditional association of logistics with free movement and circulation. Rather than eliminating friction and enhancing circulation, logistics also produces zones of obstruction that multiply the segregation and confinement of specific regions and populations, turning into an instrument to actualize precise geopolitical reassessments. Similarly, Stephen Ramos focuses on the architecture of confinement between the United States and Mexico, sadly intensified in the last months by Donald Trump's immigration policies. Drawing a parallel with the system of the global supply chain, the author demonstrates how the US immigration detention system utilises the border and spatial administrative tools to control and modulate the incoming fluxes of foreign labour force. Nevertheless, if the spatial optimisation of the immigration camps controls, arrests, and stores bodies as commodities, logistics is also able to put bodies in motion, contracting actions and accelerating their biorhythms. Analysing Francesco Mattuzzi's film *The Weight of Dreams,* Renzo Sgolacchia and Alex Retegan describe the hectic daily routine of a couple of drivers living and working in the four square-metre cabin of their truck. The cabin and the trailer of the truck join productive and reproductive activities in a unique mechanical assemblage: a nomadic form of living directly produced by the container revolution of the 1960s. The intrinsically parasitical nature of the logistic apparatus is also the subtle core of Marcello Tavone's photographic essay *HomeWorks*. He investigates the isotropic conditions of urbanity characterising the landscape of the Veneto valley, moving from the Roman *centuriatio* that had structured settlements across the region, to the Renaissance *villa rustica* that provided the appropriate architectural paradigm for the urbanisation of the plain, to the present sprawling constellations of hybrid single-family homes, mechanically equipped with depots, warehouses, industrial and working facilities, juxtaposing the idiosyncratic residential

dimension of the detached house with the global sphere of logistics within an ambiguous unique form.

The third trajectory tackles the past, present and future of logistics, considered as the most crucial apparatus determining the human impact on earth, controlling the distribution and organisation of organisms and ecosystems, triggering new and more violent forms of colonisation and exploitation. Giulia Scotto analyses the ambivalent role of infrastructure in the military and political colonisation of Zambia during and after the period of British rule. Under British control, logistics enabled the extraction and exportation of resources, shaping the national territory and the basins of labour power through railway lines and interchange stations. After independence, the intervention of multinational actors in the construction of roads, railroads and pipelines, logistics served as a support to propagate the autonomy of the new Zambian state. Nancy Couling and Carola Hein meditate on the advanced petrochemical logistics of the North Sea and how its infrastructural network of offshore and inland distribution could be leveraged to invent new forms of architecture and democratic participation. Finally, with their exhibition *Ambiguous Territories* Kathy Velikov, David Salomon, Cathryn Dwyre, and Chris Perry meditate on the negative biological, atmospheric and geological externalities produced through centuries by the construction of a supposedly frictionless network of exchanges, conjecturing strategies for reducing or reversing these tendencies through an alliance of architecture with other fields of knowledge.

In a moment when architecture and logistics seem to be severed domains, when architects are profitably summoned only to enhance speculative waves of gentrification or relegated to the simple task of mending the schism between cities and infrastructure, the need to elaborate a theoretical position on logistics for the discipline becomes increasingly urgent. This issue of *Footprint* does not offer definitive statements or hypothetic solutions for the monstrous nature of logistics. On the opposite, it aims at unfolding its inner contradictions to propose new possibilities for the architectural project or, to use Massimo Cacciari's words, rather than getting rid of conflicts and anomalies we, as editors, wanted to open up possibilities to try to 'give them form'.[2]

Notes

1. Keller Easterling, *Extrastatecraft: the power of infrastructure space* (London; New York: Verso, 2014).
2. Massimo Cacciari, 'Nomads in Prison,' *Casabella* 705 (2002): 106-108.

Biographies

Francesco Marullo is an architect and educator. His research focuses on the relations between architecture, labour and the space of production. He holds a PhD in History and Theory of Architecture from TU Delft and he is an assistant professor at the UIC School of Architecture in Chicago. Previously, he taught at the Berlage Center, TU Delft, the Rotterdam Architecture Academy and collaborated with the Office for Metropolitan Architecture, DOGMA and the Urban Planning Department of the Roma Tre University. He is a founding member of the research collective The City as a Project, the think tank Behemoth Press and Matteo Mannini Architects. His work has been internationally exhibited and featured in various architectural publications. He contributed to recent volumes *Into the Wide Open* (dpr-barcelona, 2017), *Counter-Signals* (Other Forms, 2018), *Work, Body, Leisure* (Hatje Cantz, 2018) and co-authored the book *Tehran: Life within Walls* (Hatje Cantz, 2018).

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The Floor Is Not the Ground: Ecologies of Interruptions in Transportation Infrastructure

George Papam Papamattheakis

Introduction

Harbours, airports, train and underground stations, as well as interchange yards, hubs, and warehouses are all understood within the broad framework of logistics. Moving people and goods is considered an interconnected theme of great importance in the twenty-first century, since the relentless technological innovation in the fields of communication and transportation has fostered global exchanges and competition.[1] Despite their apparent similarities, mobility of people and supply of goods are two separate types of circulation, for the nature of the object to be moved differs: living beings or lifeless objects. Yet, despite this gap, and due to their generic grouping as logistics, transportation infrastructures have largely been led astray by the remarkable developments of the fulfilment supply chain. Strategies and formations originally established to ensure the integrity of product and capital flows are expanding beyond their original field and scale, to structure the back end of human mobility spaces, imposing narratives of efficiency, security and restlessness, eventually treating people like packages in circulation.

Although these logistical strategies are in line with the dominant understanding of infrastructures as mere functional assemblages, ports, airports, train stations, and bus terminals are doing more than just supporting movement and circulation; they are essential public works with direct reference to their everyday users.[2] If we think of everything that is public anyway, spaces of circulation constitute a significant part of it. Unlike other public works like dams, water pipelines or internet cables, transportation infrastructures are unavoidably and by definition open to the public, thus bringing the potential of being active public spaces, in the way James Corner understands them: 'public space in the city must surely be more than mere token compensation or vessels for this generic activity called "recreation"'.[3]

Nevertheless, considering the primacy of the fulfilment supply chain tactics, it is an architecture of logistics that seems to be structuring this major division of public space. This essay is an effort to challenge the contemporary 'fulfilment'-influenced, network-based perception of human transportation spaces, towards, instead, a relational – and effectively political – understanding. This is not only to suggest the re-emergence of localities and traditional notions of place in defence of identity, something that has previously been extensively debated, but mainly to seek possible strategies to interrupt this detrimental, endlessly intensified circulation imposed on public space, and to allow more humane, place-specific spaces to emerge. In the words of Alberto Toscano, the question of what use can be drawn from such disruptions 'in a world no longer dominated by value, proves to be a much more radical question, and a much more determinate negation than that of how to render the metropolis, and thus in the end ourselves, useless'.[4]

I argue that this project is an effort to break free from the universal floor of production and distribution, moving on to embrace the more uneven specific grounds of friction and aberration. The argument is structured on the potential recalibration and rebalancing of these two conflicting sets of forces, conceptually represented throughout the essay by the notions of floor and ground respectively. Contemplation on this pair of terms was triggered by the observation of a recurring confusion between the two in the literature.

The floor: the key ingredient to logistics cooking

The metropolitan agglomerations we inhabit today have their history rooted in circulation concerns. Lewis Mumford identifies the supply chain as one of the indispensable support mechanisms of the contemporary city. The unlimited accumulation of populations at specific locations made it crucial 'to widen the basis of supplies and to protect the "life-line" that connects the source to the voracious mouth of the metropolis'.[5] Indeed, at the founding moments of 'urbanisation', Ildefonso Cerdá produced his theoretical treatise *Teoria de la viabilidad urbana* (theory of urban viability), inventing a neologism to emphasise his concerns for the via, the road.[6] His theory points out the continuity of movement as the first law of *vialidad*, triggering extended studies on the network of ways, the layout of the streets and the nodes of intersections. The well-known chamfer of the Barcelona building blocks emerges as the optimised version for transport and logistics services, largely determined by relevant turning angles of the era.[7] Reducing the city to the urbs, maintaining only the necessary components that support the circulation of capital, was one of the steps towards the problem of the metropolis as Massimo Cacciari put it: 'the Metropolis is the general form assumed by the process of rationalisation of social relations … which follows that of the rationalisation of the relations of production'.[8] Identifying evidence of this development in the contemporary urban experience shaped by logistics is not a difficult task. Internally, workspaces of logistics are increasingly calibrating workers' bodies 'with the needs of an automated system of stuff' in a 'more-than-human' environment.[9] Entire territories covered by dedicated gateways are emerging, sometimes even calling themselves 'cities'. Logistics cities promote bare-labour ways of life and are often comparable to concentration camps.[10] External to these spaces of exception, despite the logistics promises of shrinking distances, consumers seem to be more distant from the producer and the production process than ever. Jesse LeCavalier observes the archiving of consumer wills in warehouses: the 'configuration of the inventory is a dynamic index of consumer desire mediated through the bar code'; human desires have come to be reflected only through impersonal warehouse directories.[11]

Such transformations of social relations are well explained by the emergence of what Manuel Castells labels the space of flows; 'the dominant spatial manifestation of power and function in our societies'.[12] The space of flows emerges as a highly relevant conceptualisation of contemporary social-spatial theory in which the territories of logistics are of utmost importance, serving as its material support. 'Our society is constructed around flows: flows of capital, flows of information, flows of organisational interaction … Flows are not just one element of social organisation: they are the expression of processes dominating our economic, political and symbolic life.'[13] Castells goes on to describe the layers that structure the space of flows. First come the exchange circuits, the spokes and network branches that sweep across space; they ensure connection lines for the flows to travel. Then follow the points to be connected, nodes and hubs to serve as departure, distribution or arrival terminals of the traveling flows. The space of flows emerges like an abstract but powerful mesh, capable of

assigning roles and determining relations and hierarchies among points in space, yet floating above them establishing no associations whatsoever.

Faithful to the space of flows and its structure, logistics organises physical territories in conduits and nodes, also applying a smoothening layer in both these levels of organisation, a layer that makes fields easily navigable and efficiently controlled; it is a kind of 'floor', working across scales and declaring universal ease of access. Traversing its literal and metaphoric meanings, the floor becomes the basic tool to tame and eventually overcome physical geographic abnormalities, to homogenise context and prepare a smooth surface for the frictionless circulation of commodities. The floor becomes the stage for the everyday logistical choreographies of infinite complexity, dances prepared beforehand in detail by a 'regime of total awareness and control'.[14]

Looking at the nodes and hubs scattered around logistics networks, the floor becomes apparent within its strictly literal framework. Logistics facilities occupy vast lands to house their operations; essentially in need of horizontal surface to stack stuff, warehouses and distribution centres produce impressive footprints. Additionally, considering their exterior premises, including parking lots, receiving zones and staging areas, Clare Lyster aptly notes that it might be better to talk of a 'logistics landscape'.[15] Scattered throughout its body, the floor carries instructions for use; arrows, separating lines, stop signs, inscriptions, numbers, and other graphic patterns that communicate its operating protocol. Although low-tech, this kind of horizontal readability must have inspired its later upgrade to become an information carrier, or in Keller Easterling's words 'the brains of an intelligent navigation system'.[16] The floor may incorporate hardware, from tiny mechanical roller balls assisting container hauling, to RFID and GPS tags guiding automated robot vehicles. The dominance of the floor renders the rest of the architectural elements unimportant. If not completely absent, like in container parks, the envelope is reduced to its minimum infrastructural necessities, be that protection from the weather, or housing lighting, ventilation and air-conditioning. Instead of walls or other surfaces, verticality is rehearsed by vehicles already inhabiting the logistics floors, capable of moving not only two-dimensionally, but also in the z-axis. Conveyance systems of this kind shape a whole new structure and suggest new environments.[17]

The floor is indeed the most important physical element of logistics space, but we feel it is helpful to further our understanding of the floor towards a more metaphorical deployment. Zooming out, we see logistics entities leading a life of their own. Their floors, seemingly installed in the middle of nowhere, operate as the projection of the air-floating mesh of the space of flows. Regardless of their surroundings, the only thing that matters is the potential link to the rest of the network. Castells stresses this placeless logic of the space of flows and Lyster goes on to proclaim the network as the 'new context'.[18] This intrinsic incompatibility with physically contiguous environments is essentially another mechanism of friction removal. Applying its figurative meaning, logistics floors defy any language they don't understand: human, environmental, cultural, historic and so on.

Adjusting our lens and looking at spokes and conduits, smoothing has a long history. The first public floors were roads used to facilitate trade and army manoeuvres. Evolving from navigating through pre-existing fields, civilisations started creating manufactured strata. Maxwell Lay notes that the concept of artificial road pavements was introduced by the Minoans in around 2000 BC and after that by the Carthaginians, as an alternative to the earlier technique of simply improving the existing ground. This effort to establish circulation channels from

scratch is also evident in King Nebuchadnezzar's statement after conquering Lebanon around 600 BC: 'I have cut through steep mountains, I have split rocks, I have made a way through and built straight roads for [exporting] the cedars'. The Romans later built on this heritage and improved existing techniques to create their extensive network of roads, bridges and tunnels for which their empire is famed. Their circulation floors were not surpassed until the railroads made their appearance throughout the American landscape in the mid-nineteenth century.[19] Circulation has since begun to require more global narratives, linking spatially and culturally distant regions. Easterling argues that 'universal stories have … accompanied aspirations for shared, rationalised infrastructure platforms'. The shipping container came to be an example of such universal implementation, indistinguishably tidying different goods up in twenty-foot-equivalent boxes.[20] Service quality combined with security proclaims the necessity for a stable underlying structure to carry out circulation. Like other floors, contemporary logistics corridors are the most representative instances of this tendency. Reminiscent of the amber road network formed around 1500 BC, dedicated freight corridors in India and international recommended transit corridors in the Gulf of Aden are planned to facilitate and secure the transportation of goods, particularly in precarious areas.[21] Laying floors to level out unevenness emerges as the most relevant strategy of logistics; the floor as an apparatus of space organisation emerges as the essential element of architecture and strategy in logistics landscapes.

The floor expanded: influences in transportation infrastructure

Yet the floor is not limited to the enclaves of logistics; it escapes the closed systems of warehouses, distriparks and logistics corridors, to structure human environments too: harbours, stations, terminals, streets and cities. It carries along its technological accessories and contagious narratives of seamless circulation, all mixed up with network obsessions. Hence, influences of logistics space on transportation infrastructures is more or less evident in both its hardware and software. I will try to illustrate with examples of the technological apparatus, the structure of space and its overall placement.

People standing on travelators in airports bring to mind the image of suitcases circling around the baggage reclaimers a level below; although the conveyor belt was initially invented for the production space of the factory, it is no less a machine for circulation. Shuttles carrying people on board from the terminal and other driverless rapid transit conveyances follow the model of automated vehicles to be found around logistics warehouses and parks. Easterling investigates companies like FROG, which besides producing sophisticated automated guided vehicles to handle containers, are also entering the market of civilian transportation.[22] In the realm of personal automobiles, automated vehicles imitating experimental logistics projects like the Transcar have appeared in photorealistic visualisations of fellow practitioners moving both horizontally and vertically through their projects.[23]

Furthermore, the patterns of transport infrastructures have been infiltrated by logistics-influenced repeatable formulas; best practices suggest seamless assemblages throughout the world, for circulation speaks a universal language. Most airport terminals fit within a limited typology of five instances, while passenger ports feature seamless truck parking rows and specific fence sequences to comply with the international ship and port facility security codes.[24] At the same time, the structure of transportation spaces is dominated by functional diagrams and flow charts. Terminals of any kind guide crowds to check-in, shop, and board as smoothly as possible. Following the logistical art of space optimisation, designers seek the minimum

walking distance arrangements, while airlines propose a number of ways to arrange more people in cabins: from Airbus's bicycle saddle-like rows to Aviointeriors's standing-up seats and Zodiac Seats' hexagonal seats facing alternately forward and backward, we are reminded of the tight arrangements of twenty-foot equivalent units and pallets on ships and trucks.

Transportation spokes and hubs are mostly arranged according to the hierarchies of the space of flows, imitating the abovementioned logistical strategies and ignoring both the physical context, and its place-specific cultural attributes. Train and highway conduits link points on the map, almost ignoring people and places in between and around them. Highway flyovers in dense megacities like Mumbai shrink distances by literally stepping on and covering the existing urban fabric. Looking at nodes, passenger ports in places like Venice or Stockholm follow the airport model and leave the city waterfront to explore virgin frictionless places along container and bulk ports. Ryanair airport choices land people in the middle of nowhere, while metro stations sometimes emerge in the periphery of the area that they are named after.

After all, it's impossible to tell that figure 1 depicts a port, let alone the contemporary passenger port of what was once the largest maritime empire. [Fig. 1] Having travelled almost twenty kilometres out of the island of Venice, passengers arriving at Fusina port pass through a security check and are then asked to navigate through parking lots full of identical rent-a-cars or colourful container-like stacked parked trucks, following a marked path on the floor. All that seems to matter is to get to their ship as quickly as possible, to escape this emptiness of space and time. Exactly like the optimisation of an item's time spent in stock, passengers get to the harbour just in time, they board the ship just in time; only just-in-time geographies is what they get. Public spaces of transportation infrastructure are structured as the mere vessel to facilitate and guide flows. To quote Rem Koolhaas, 'as more and more architecture is unmasked as the mere organisation of flow …, it is evident that circulation is what makes or breaks public architecture.'[25]

This expansion of the logic of the floor means certain qualities and features of the fulfilment supply chain related to technology, quality, security, standards and space structure are bequeathed to transportation infrastructure. Developed in the context of lifeless entities and aiming for their optimal circulation, such features may suit the spaces of logistics, but are problematic when expanded to the realms of architecture and urban planning. People are treated like mobile packages rushing from A to B on a networked, yet frictionless surface, as if transportation is based solely on the space of flows, serving only the circulation of capital and information. Although it is true that passengers' demands for circulation and interconnectedness shape and justify the transportation network, the interrelations of humans with space and context cannot be overlooked. For transportation infrastructures are primarily dedicated to serving living beings, and are placed in a specific urban context, among people who unavoidably develop experiences and memories, even without using these infrastructures for their primary purpose. Hence transport infrastructures stand in a peculiar position between the space of flows and – its competitor according to Castells – the space of places: different from a mere instrument of flows, like a container port, but more than just a place-specific locale, like a neighbourhood square, harbours and train stations are something in between. I would posit that logistical tactics disregard this peculiar placement of transportation infrastructures between flows and places, shaping the public domain of transition by imposing two interrelated structural changes in space.

To understand both these changes, we first need to acknowledge the foundation of circulation upon relative space. David Harvey's tripartite division of space is relevant here, which breaks it down in three distinct categories: absolute, relative and relational.[26] 'Absolute' stands for the fixed pre-existing space responding to standard measures, while the 'relative' notion distorts the former according to different frames of observation; for example, looking at length, cost, or travel duration results in different understandings of distances between two locations. The space of flows, dictates hierarchies and priorities, and is therefore a strictly relative conceptualisation of space: the movement of goods and people happens in the relative space, dependent on issues of location, distance and proximity.

Such a formulation of space is highly compatible with soulless objects like container boxes, crates, packages, and envelopes, but this is arguably not the case with places and humans. A person inevitably perceives Harvey's third category, relational space, forming experiences, internalising and translating external stimuli. This break between a relative and relational understanding of space, representing the break between flows and places, brings us to the first structural change of transportation infrastructures: the network leaves no space for human stimuli to make sense; on the contrary, a certain logistical tendency to overprotect and securitise its operation becomes evident. When people without access to a car literally ran for their lives evacuating New Orleans on Interstate 10, during hurricanes Rita and Katrina, they were stopped at gunpoint, because freeways are for cars, not for pedestrians.[27] Deborah Cowen observes that 'the circulatory system itself becomes the object of vulnerability and protection, not human life in any immediate way'. Logistics circulation systems are treated as 'vital systems' to be preserved and safeguarded, considering human living conditions subordinate, and thus, 'making sense of logistics … requires an elaboration of the "more-than-human" politics of nature.'[28] Users of space are not people with a past and an identity, they do not have memories and fantasies, they are only represented by their ticket-, passport-, car number plate-, or ID number. They are reduced to 'no more than what [they do] or experience in the role of a passenger, customer or Sunday driver'.[29]

In the relative spatio-temporal understanding of transportation spaces, where frames of observation result in different perceptions, the time frames of flows and places clash. In the space of flows, Castells elaborates the concept of timeless time as the result of the compression of the occurrence of phenomena, while in the space of places he acknowledges the existence of distinct socially bound temporalities.[30] The balance between these two spatio-temporal frameworks 'can', in Harvey's words, 'illuminate problems of political choice': favouring the slowest timeframe of places may disrupt the restlessness of people's flows.[31] This takes us to the second change: contemporary transportation spaces seem to favour timeless time, organising open spaces and buildings accordingly. Influenced by their logistics counterparts, transportation public and semi-public spaces are mostly byproducts of the space of flows. In these domains, people run after the clock, indifferently crossing spaces between their points of interest; travel is reduced to transitions.

These two changes in transportation infrastructures are rooted in the very idea of smoothness; they are caused by the domination of the floor. The latter, I argue, could represent a literal reading of Jacques Rancière's concept of the police, as it 'asserts that the space of circulating is nothing other than the space of circulation'.[32] Passengers can have no other will than to move from one point to another. Subjects that deviate from the primary transportation purpose are unwanted and expelled.

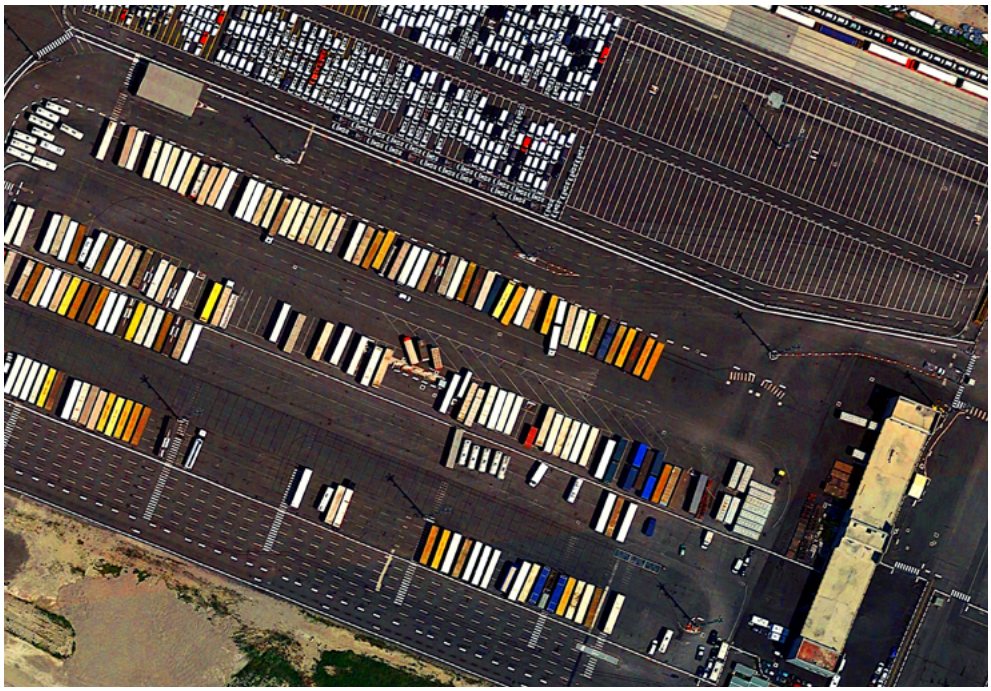

Fig. 1

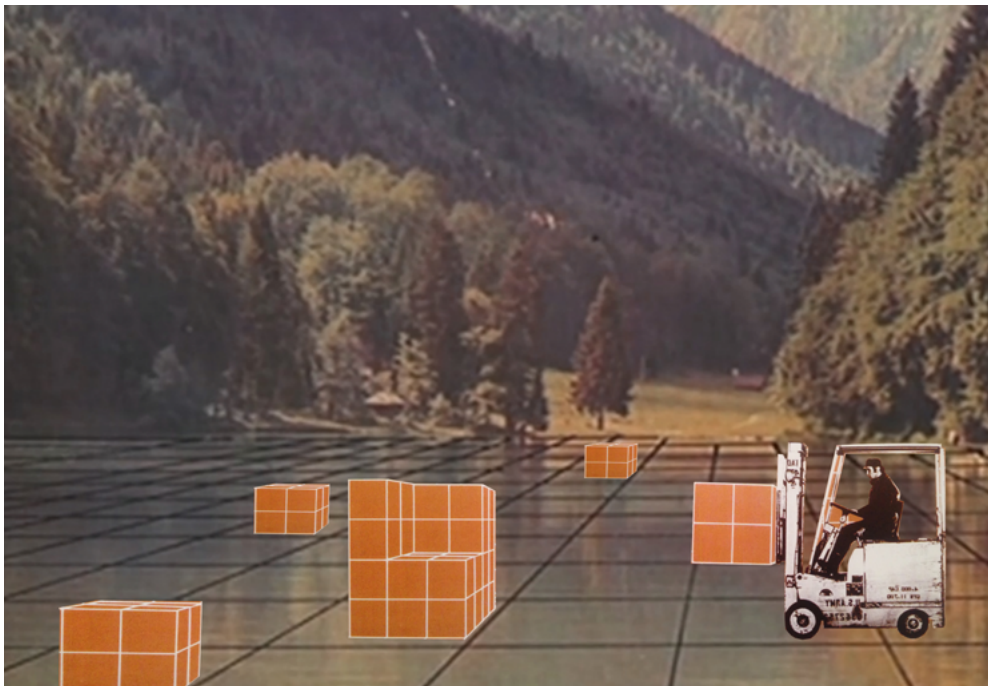

Fig. 2

Fig. 1: Fusina passenger port. A space reserved for humans, designed for objects. Source: 'Fusina, Venice, Metropolitan City of Venice, Italy'. 45º25'33''N and 12º15'10''E. Google Earth. 29 May 2017.

Fig. 2: Superfloor. A collage of a US army logistician moving stock around the Supersurface, an infinite smooth area supposedly receptive of every kind of life activity. Digital collage: Jenny Lazari and the author.

This friction neutralisation implies an absolutist regime of compulsory consensus, which in turn leaves no chance for the appearance of the subject, reducing human movement to algorithmic roaming between points of departure and arrival. In a port like Fusina, a person has no other option than to follow the security protocols, check their ticket and passport, and then move from the terminal to the boat. Spanning pedestrians, cyclists, drivers, truckers, car rental workers, and every other possible user, there is a predetermined sequence of steps to navigate the space. Moreover, space is calibrated to fit this sequence only; any effort to stage alternative activities, from a cultural event to a demonstration, is usually rendered incompatible and unacceptable. In the most introverted and distant part of the port of Piraeus in Athens, the port authority, practically managed by the COSCO shipping company after recent privatisations, did not allow a memorial concert to take place on the port premises. Although permission was requested by the municipality of the neighbouring suburb Drapetsona, the port authority cited security risks, lack of space and incompatibility of programmes.[33] Once the floor, with its attributes and protocols, is determined, it demands to be followed, invoking a certain functionality. Welcoming only subjects who 'move along', the floor is monofunctional, overspecified and highly exclusive.

Floor versus ground: a misunderstanding

In an effort to rethink the floor in a less specified and more inclusive way, one is reminded of Superstudio's concept of the Supersurface, a neutral infrastructural mesh that wouldn't impose fixed settings or protocols of use, thus being compatible with nomads, girls with skipping ropes, domestic environments including ironing boards, and cactuses.[34] To achieve this, the Supersurface flattened an infinite field, imposing a seamless grid to accommodate everyone equally. Likewise, the US army's magazine *Army Logistician* features an image of an orange grid covering everything around a forklift worker, displaying similar flattening tendencies.[35] [Fig. 2] The floor's smoothness could allegedly be employed to welcome different subjects and activities. However, any effort to rethink the concept of the floor would be confined by its existing limitations, rules and understandings – just like in Superstudio's video, the Supersurface only plays upon the available flat fields, unable to climb mountains, hills and glaciers. An inclusive floor would just be a realignment of the existing rather than something inherently new; it would be a modification rather than a substitution.

Instead of resisting the floor on its own terms, what we are looking for is a different language. Such a language that is compatible with the openness and the acceptability of some 'supersurface', but also embraces cliffs, mountains, and other uneven fields, can be found in the notion of the ground. It is arguably only subtly differentiated from the floor, yet the two exist in different worlds. In everyday parlance, 'floor' and 'ground' tend to be conflated. Some dictionaries add to the confusion, when for instance, 'ground' appears as a synonym of 'floor', but not vice versa.[36] Similarly, in relevant theoretical literature of architecture and logistics, the two are sometimes used interchangeably. Easterling, for example, writes: 'the ground or floor, more than merely the durable surface underfoot'.[37] But even more indicative is chapter 5 of Lyster's book *Learning from Logistics*, entitled 'Architecture/ Smart Landscape, Dumb Building: Ground Rules'.[38] Throughout the chapter she uses the term 'ground', either generically meaning 'the lower surface underfoot', or more specifically 'artificial floor', 'natural ground' or 'landscape'. She understands the ground at the same time in Robin Dripps's 'natural' manner, in landscape urbanism's 'landscape' manner, in Hadid's and Eisenman's 'geomorphological surface' manner, in the Laurentian Library's 'floor' manner and in WWII camouflage's 'artificial surface' manner.[39] Apart from the fact that many of these

views of the ground are mutually exclusive, this kind of misuse of the term arguably undervalues its meaning, missing its distinct potential. Grasping these two distinct natures is the first step towards the change of mentality and the project of interruptions we are aiming for.

Indeed, the difference between the words is not just lexical but also semantic. 'Floor' is an Old English word, then written flōr, and it stood for 'the lower horizontal surface of a room', but especially for one covered with boarding or parquetry. But significant is that its distant root (*pele), means 'flat; to spread'.[40] 'Ground', on the other hand, appears as grund in Old English, with its root (*grundus), meaning 'deep place'. It represented the 'earth' and the 'foundations', basically denoting the basal part of something, while the meaning could extend as far as the 'abyss' or the 'depths of Hell'.[41] Carole Biggam, in an article exploring the use of Old English words in architecture, concludes that 'the grund of a building is its horizontal base, either below or on the ground surface', yet it is in both cases 'invisible after the structure has been built'.[42] After all, and although uses of flōr have occasionally been synonyms of 'ground', the difference between the two has an almost spatial manifestation: both stand on the surface, yet 'floor' spreads, while 'ground' digs the depths; eventually the floor is visible while ground remains submerged.

This 'invisibility' of natural ground is arguably the source of the occurring conflation, and is a cultural matter, with deep roots in Western, especially European, post-Renaissance history. Ancient civilisations valued the ground either for its fertile or memorial capacity; Egyptians, Greeks, Mesopotamians, Chinese, and Native Americans celebrated cycles of nature or even established whole religious theories of afterlife based on it.[43] However, inductive reasoning and progress in laboratory isolation that arose during the scientific revolution of the seventeenth century, established, in James Corner words, 'a detached distance between the human and phenomenal worlds, enabling humankind to assume a position of supremacy over nature'.[44] In the process or rationalisation and mechanisation of the world view, the ground was discharged as a mere natural system that should be studied in order to optimise its rough and unstable qualities. Horizontal surfaces in developed civilisations were covered with 'floors', controlled and regulated surfaces, from the interiors to the whole city. Hence, the deep, erratic natural 'ground' of Old English has been buried under many covering overlays and subsequently forgotten, while a new 'ground' emerged, more superficial and more closely related to the floor. This 'new ground' is nothing more than the floor of the exterior, the floor in disguise. [Fig. 3]

The ground is no less invisible in the fields of architecture and urbanism. Rather expectably, architecture, as an art of taming the natural elements to establish a protective separation for human beings to dwell, has suppressed the ground. Aaron Betsky, following Vitruvius and citing creations as early as the ancient Greek temples, notes that the act of building has been one of defence or defiance against land and nature.[45] Robin Dripps notes that the ground is considered an abstract generic background so as to fit the need of architecture (and humans) to stand out.[46] The recent resurgence of the landscape following the emergence of landscape urbanism is, in fact, a step towards the reappearance of the ground. The idea of dealing with landscape operationally reveals the importance of process and brings new understandings of the ground as part of a wider ecological system. Nevertheless, sometimes, even within the realm of landscape urbanism, pure systematic thinking renders groundworks abstract again. Flows of materials, water, energy, or information may take us back to floor-like protocols. James Corner, in his frequently cited text *Terra Fluxus*, recognises the horizontal surface as one of the basic concerns of landscape urbanism.

As he points out, these surfaces, operating like continuous infrastructures, 'sow the seeds of future possibility'.[47] However, thinking of the overall exclusive and flattening nature of the floor we presented above, we believe it is the ground that allows for the potential of sowing; the qualities of the ground include not only 'promise' but also 'uncertainty'. Thus, a de-systematised understanding is imperative so as to arrive at new definitions.

The ground: assembling a toolbox

The claim for the invisibility of the ground seems counterintuitive when one thinks of contemporary western philosophy and especially phenomenology, where certain ideas concerning ground, terrain, and territory have been the subject of an immense discourse. The ground as pre-existing matter and an archetypical common operates as the cultural definition of a place; it is where physical geography and history merge to form Schultz's genius loci. The ground then negotiates issues of origins and identity, while certain thinkers extend its scope to issues of territoriality and sovereignty.[48] Yet this way of dealing with the ground only affirms the invisibility of its 'natural' nature. It is impossible to challenge the utterly 'productive' floor only by looking at the ground as an archaeological relic, one that carries history and heritage. Although very important, these elements are weakened in today's globalised world. Instead, we need to readjust our vision and look for the ground's distinct type of productiveness. This vision is in fact marginal, mostly evident in recent literature on degrowth and ecology, or certain food and farming practises. Following theories or practises like these, I believe the ground may emerge as an antidote to rebalance the dominion of the floor.

That such a project sounds simple, is because modern farming practises have become overly simplistic. Indeed, mainstream contemporary ground treatment seeks to transform it into some kind of floor: overspecified, perfectly smooth and utterly productive. Artificially aided, intensified monocultures exhaust valuable nutrients from the ground while also altering seasonal crop cycles. Representing the contrary position, chef Dan Barber describes his telling experience of improving their farm, by gradually adding livestock: goats to push back the forest, then chickens to improve the pasture, then cows to improve ground nutrients: 'as you get deeper into these symbiotic relationships, you're only improving the grass … To support the continual improvement of the whole system is the goal for better flavour.'[49] Barber's permaculture exploration emphasises diversity as the key to the productivity of the ground. It is exactly this combinatorial potential that I want to address: the possibility to accommodate and reconfigure fragments in no predetermined way. In her essay, Dripps reflects on the potential of the complex ecological system of the ground:

> Grounds operate with great nuance. They resist hierarchy. There are no axes, centres, or other obviously explicit means of providing orientation. Single, uncomplicated meanings are rare. Instead, there are open networks, partial fields, radical repetition, and suggestive fragments that overlap, weave together, and constantly transform.… Relationships among grounds are multiple, shifting, and inclusive.[50]

If anything, the ground is open and hospitable, which makes it a changing and fluid field, one that is hard to isolate and measure. If the floor is created with accurate calculations, the ground slips through them.[51]

This multivalence, volatility and inclusivity also suggest the acceptance of random and unexpected events, inevitably making the ground chaotic and unstable. And this, I would argue, is the reason why this way of being productive is radical; in its ultimate manifestation of inclusivity, the ground accepts errors too. Weeds are the most representative example, being a flaw by definition. Setting aside their interference in the human cultivation of crops – which is

a matter of human priorities – certain weeds can be noxious and invasive even in a naturally sustained ecosystem. Still, breeding weeds is considered a natural tendency of soils because of the nutrients diffused in their body.[52] Moreover, the ground also accommodates a multitude of other microorganisms that may under certain circumstances cause a nuisance. Nematodes and acarids that attack plant roots, illness inducing protozoans and very corrosive fungi form part of different complex interweaving ecosystems.[53] Although aberrant or harmful in certain placements, scales, or quantities, they are not recognised as errors to be covered or removed.[54] The ground's resistance to hierarchy, a notion well articulated by Dripps, stands for resistance to the unilateral or exclusive valuation of one system over another; one system's trash can be another system's treasure. In this way, more than just being cosmopolitan, the ground is truly open to error, being itself finite. Healthy soil exploitation requires fallow cycles, to allow for the replacement of nutrients and minerals. Unlike the infinite overwhelming expansion of its competitor, the ground is modestly and unpredictably fruitful.

Bringing these ideas together suggests a varied and bumpy surface; it represents a different understanding of productivity, one already celebrated by degrowth and ecology as mentioned above, but most importantly, one that the floor cannot grasp. Unlike how the latter would comprehend production, the ground is multifarious rather than homogenous, it is persistent rather than intense. Similarly, unlike how floor would comprehend disruption, the ground is rough rather than discontinuous, it consists of distinct finite elements rather than fragments. Here the language differentiation we are in search of starts to appear: the floor and the ground both 'say white' but they 'do not understand … the same thing in the name of whiteness'.[55] The vocabulary of this language consists of the ground's intrinsic characteristics we discovered above.

Openness, a variety of simultaneous systems, an interweaving of scales, finity, and deviation acceptance compose the aspects of the ground's software that we are interested in. However, this software does not strictly represent naturalness. Contrary to Dripps, who in her *Groundwork* speaks of the ground mainly as the 'natural' which has to get connected to the 'human-made', the ground's software is not to be limited in natural land, soils and landscape. Thus, I will not suggest assembling landscape design tools like hummocks, groves and soils to counter how transport is logistical. Instead, one has to look at how the floor introduced certain protocols to be applied beyond its literal material state: in the aforementioned example, an intensive mono-cultivation of corn in California adheres to the floor's precepts of smoothness and stability; as do the infinite greenhouse landscapes in southern Spain's Almeria.[56] Thus, the floor is not only about cement and tarmac non-organic surface constructions in cities. Likewise, the ground does not stand only for natural entities. Subsequently, the distinction I am maintaining throughout the essay does not correspond with the duality between natural and artificial, as it is formulated in Landscape Urbanism. Urban structures, like those of transportation infrastructure, may feature the ground software described above.

Ground floor: balancing interruptions

So far, I have separately elaborated the themes of the floor and ground, to make their strong but veiled difference visible; however, the two are found in constant mixture, especially in the case of transportation infrastructure, where flows are involved along with places. Resembling Deleuze and Guattari's oppositional metaphors like the smooth and the striated, the ground and the floor have intermingled throughout their history.[57] Indeed, although the 'smooth' spaces of the ground have been progressively striated by floors, in order to be controlled and measured, various scattered errancies and contradictions, from unpredictable weather phenomena

to pirates, sustain a certain smoothness.[58] Despite the prevalence of the floor from language to practise, the ground retains its dynamic of emergence. Returning to weeds and the other ground 'errancies' referred to previously, we see that they appear among cultivations, grow in the middle of neat natural reserves, and rise through cracks in cement. The ground has its own way of establishing diversity, filling in its competitor's gaps, taking advantage of its weaknesses.

Bearing in mind the constant mixture of the floor and the ground, 'the direction and meaning of the mix', and essentially their balance, becomes a crucial consideration.[59] On the one hand, weeds appear localised in places where they are not wanted, occasionally interrupting cultivations and natural reserves. Some crops may be destroyed, some indigenous or protected plants may be damaged, but farmers and preservationists remain united in their battle against noxious species, limiting their expansion and leading to a fluctuating balance. On the other hand, certain weeds and vagabonds may eradicate whole species, or even take over entire territories. Such a radical alteration that introduces a 'second nature' is reminiscent of an eruption process, a forcible alteration of a given context.[60] These two categories, abrupt eruptions and continuous fluctuations, represent two main ways in which the ground and the floor come together, mostly expressing the way the ground emerges to challenge the floor.

When the ground erupts, it mostly causes a temporary breakdown to the systems of the floor. Natural disasters and severe failures – like the road collapse in Fukuoka, legal or illegal occupations, like the vegetable markets held on streets with vendors replacing traffic, but also demonstrations, strikes, and even pirate operations – are some relevant examples. Lining up vehicles or bodies to block highways is a common form of demonstration. Spaces of pure unimpeded circulation are repurposed to accommodate different functions, different ecosystems, immobility and friction; the floor then collapses, wholly or partially, for its protocol is defied. The ground takes full advantage of the floor's systems, structure, weaknesses and narrative. Workers recently striking at the container section of Piraeus port understood its function as a chokepoint of Chinese container trade, as well as its impact on the business and shipping image of the port, and turned these to their advantage.[61] Because of their ability to provoke severe disruptions, the floor deploys any precautionary or suppressive mechanisms against ground eruptions. The container workers' strike was immediately deemed illegal by the judicial authorities. Privatised or vital highway arteries have altered their protocol to forbid any protest or other human presence in their domain, calling in riot police if necessary, like in the case of Interstate 10 cited above. Nevertheless, ground takeover is only temporary, retreating as soon as its energy erupts. The floor quickly restores its vital functions, thus giving 'eruptions' a floor-ground coexistence throughout a specific time range.

On the other hand, the ground may become evident in a much subtler way, intercepting the floor throughout its operation. In the case of transportation infrastructure, this could mean interruptions in circulation, distractions, and detours that cause delays. These become possible through the simultaneous existence of different transport or urban programmes. Shared spaces are a good example of the former. Although they seemingly support an infinity of flows, they do encourage interruptions; drivers and pedestrians, two ecosystems with different goals and standards, are encouraged to negotiate a common field. In the completely informal, non-designed 'shared spaces' of intersections in Delhi, different transport systems interweave: pedestrians, carts, bikes, rickshaws, buses and sometimes trains or elephants, adjust

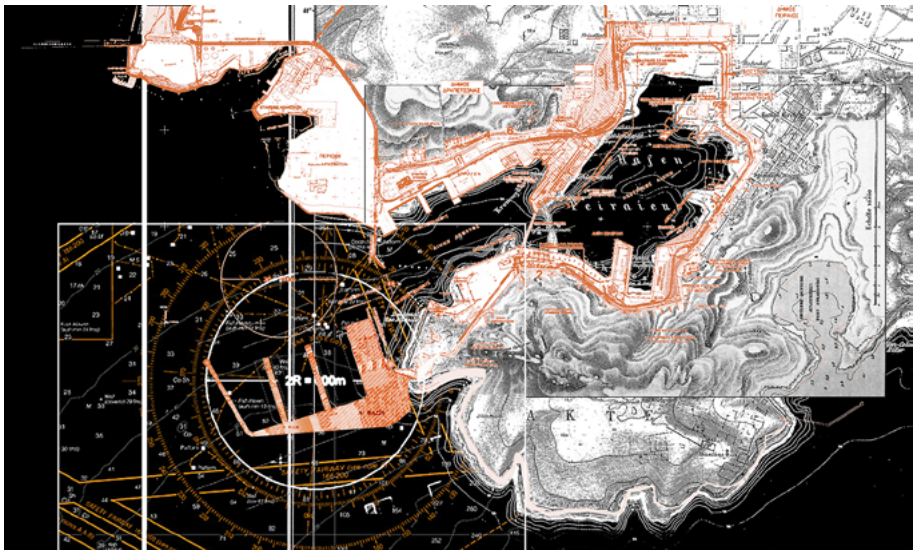

Fig. 3

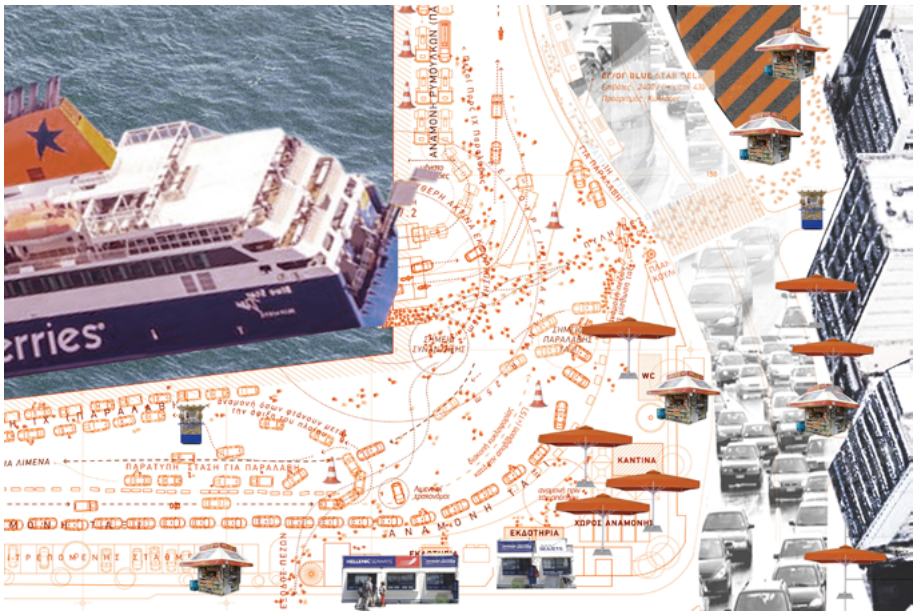

Fig. 4

Fig. 3: The floor that hides the ground. Recent privatisation of the port of Piraeus, Athens's ancient harbour, revealed a new master plan proposal for the port, including a massive six-place cruise ship anchor platform, overwhelming the physical geography of the peninsula and the natural port. The floor of tourists circulation, resembling that of a cargo port, overlays the ground, making it invisible. Digital collage: Jenny Lazari and the author.

Fig. 4: Ground floor fluctuations. Kiosks, vendors, cafes, and ticket booths merge with cars, passengers, and ships in the port of Piraeus, creating a complicated diagram; human relations and their movements reveal the ground within the floor. Digital collage: Jenny Lazari and the author.

their speed and sometimes their course to reach an equilibrium. Furthermore, an example of diverse programmes coming together in transport infrastructures can be found in the port of Piraeus; a part of the liminal space between the sea and the city is occupied by diverse entities like cars, bus stops, kiosks, ticket booths, refreshment stores, street vendors, and ships, each belonging to a different ecosystem of distinct spatial and temporal understanding. [Fig. 4] Hundreds of people pouring from the arriving ships, periodically impede car traffic on the seafront, ignoring zebra crossings and traffic lights. Conversely, heavy car traffic frustrates individual travellers who reach the harbour on foot, as they have to wait for the green light while their boat already lifts the gangways; kiosks, street vendors, and people in nearby refreshment stores and bus stops literally stand in their way. This peculiar infrastructural spectacle, is also enriched by a non-travelling audience who fish, take their dog for a walk, or just watch the ships blow their horns, complicating the task of the officers who regulate boarding. Like a parasite, the ground emerges in the body of floor, occupying its gaps and creating new ones. The ground takes an active adaptive form, making it difficult for the floor to locate and suppress it.[62] Eventually, with 'fluctuations', the floor and ground coexist in both space and time.

Given the prevalence of the floor described at the beginning of this essay, the ground's efforts to surface define its political repertoire, so long as they consist of an act of opposition; both eruptions and fluctuations are strategies to counter its appropriation. However, their categorical difference is important: following a distinction evident in Rancière, eruptions are more like resistance, whereas fluctuations are more like dissenssus. The former oppose a given context of rules, whereas the latter invent their own. Eruptions may be limited to being instantaneous mirrors of the floor, whereas fluctuations are always original strategies of another language. That said, and although eruptions are useful offensive acts of defence, it seems that fluctuations make up a stronger strategy to address the floor in the long run.

In any case, a more balanced relation between floor and ground is best pursued at the ground floor level, where the city meets the cars, the buses, the trains, and even the ships. It is perhaps not by chance that the two words meet each other there; most instances of transportation infrastructure are necessarily expressed on the ground floor, for the public to reach them. There, all sorts of different systems are capable of establishing seemingly disorderly relations and distractions. Besides, the floor is always trying to escape the complexity of the ground floor with fences, buffer zones, and concealed spaces. Useful for some while distracting for others, conflicts of purpose and temporal clashes on ground level configure a real open-ended field of potentials, yet often at the risk of even missing the boat. Eventually the ground floor tells stories of things that will not always 'work'.

Epilogue

As circulation and flows increasingly structure urban contexts in their totality, one would think that the software of the ground could be considered as generally applicable throughout the urban realm. However, we focus solely on transportation infrastructures, since unlike other public spaces, they perform under strict functional protocols. In the interface of places and flows, they seem to represent Castells's idea for spaces where 'the geography of the new history' will take place.[63] Public squares and parks may also be influenced by circulation, but passenger ports and metro stations are arguably more critical, because they have to respond to specific functional ends. Within a positivistic mentality, the performance requirements 'justify' the mono-cultivation of the floor, which becomes the end, rather than remaining the means. Initially conceptualised to serve lifeless

items, it expands in spaces of people's circulation, imposing its effective overdetermination, and eliminating spatial experience.

Nevertheless, the goal is not for the ground to take over, but rather to enter a state of reciprocity with the floor. James Corner, speaking about the paradox of the simultaneous precision and errancy of modern measurement, he comments: 'The aporia of modern measure … might actually present a situation that ought to be neither negated (poets, environmentalists), nor affirmed (technocrats, engineers) but, rather, critically appropriated and imaginatively redirected for its full, liberating promise to appear.'[64] Transportation public spaces have to balance between determinant variables, statistics, and network restrictions on the one hand, and human approximations, spontaneous desires, and intuitive determinations on the other. This recalibration is essentially a political project, not only in order to define the point of balance between the opposing forces, but also the nature of their relation. Especially in the case of fluctuations, which is a highly undiscovered field, architecture can have a definite say in inventing and designing active forms, breaking the codes of smoothness, and working with errors.

Hence, instead of debating the possibility of directing flows, I propose a reorganisation of the ontological characteristics of the ground to imply finity, imperfection, abnormality and unexpectedness, to speak a language that the space of flows does not understand and therefore cannot suppress, assisting the space of places to re-emerge. The acceptance of errancies suggests more than the typical claims of consensual diversity expressed through allegedly 'mixed' programmes of shopping malls inside train terminals. The ground software is about the symbiosis of different ecosystems, which although perhaps complementary, will inevitably develop larger or smaller areas of friction and conflict between them; different ecosystems work at different scales and have different standards, meaning they understand different things as 'right' or 'wrong', as 'efficient' or 'interrupting'. Rania Ghosn, commenting on Rancière's ten theses on politics, writes: 'Architecture is political when it engages in a quarrel on perceptible givens, calling into question nothing less than the spatial and perceptual organisation of our world'.[65] In the spaces of circulation, architecture should challenge this very protocol of circulation; in transportation infrastructure architecture should challenge the identification of subjects as mere passengers.

Notes

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1. Richard Hanley, ed., *Moving People, Goods, and Information in the 21st Century* (New York: Routledge, 2004).
2. George Foufas and George Papam, 'Public Works of Infrastructure,' *Log* 39 (2017): 95–96. This short contribution examines the terminology shift from public works to infrastructure. See also Brett M. Frischmann, *Infrastructure: The Social Value of Shared Resources* (New York: Oxford University Press, 2012).
3. James Corner, 'Terra Fluxus', in *The Landscape Urbanism Reader*, ed. Charles Waldheim (New York: Princeton Architectural Press, 2006), 21–33.
4. Alberto Toscano, 'Logistics and Opposition,' *Mute*, 9 August 2011, http://metamute.org. I have, to an extent, borrowed the idea of interruptions from this text, diverting it, however, towards different ends.
5. Lewis Mumford, *The City in History: Its Origins, Its Transformations, and Its Prospects* (London: Secker & Warburg, 1961), 539.
6. Ross Exo Adams, 'To Fill the Earth: Circulation and

Urbanization' (MPhil dissertation, Birkbeck, 2014), 21.

7. Ibid., 43–44.
8. Massimo Cacciari, *Architecture and Nihilism: On the Philosophy of Modern Architecture* (New Haven: Yale University Press, 1993), 4; see also Pier Vittorio Aureli, *The Possibility of an Absolute Architecture* (Cambridge: MIT Press, 2011), 1–46.
9. Deborah Cowen, *The Deadly Life of Logistics: Mapping Violence in Global Trade* (Minneapolis: University of Minnesota Press, 2014), 125–127.
10. In logistics cities, workers are contained in mundane isolated settlements, like the so-called 'labour village' in Dubai Logistics City, where only basic needs are covered. Working long shifts, in many instances not being able to participate in unions, and in a constant state of temporality, life consists only of work and rest. Ibid, 163–195; see also Andrew Higgins, 'China's Ambitious New "Port": Landlocked Kazakhstan', *The New York Times*, 1 January 2018, https://nytimes.com.
11. Jesse LeCavalier, 'The Restlessness of Objects', *Cabinet* 47 (2012): 97.
12. Manuel Castells, *The Rise of the Network Society* (Oxford: Wiley-Blackwell, 2010), 409.
13. Ibid., 442.
14. LeCavalier, 'Restlessness of Objects', 90–91.
15. Clare Lyster, *Learning from Logistics: How Networks Change Our Cities* (Basel, Berlin: Birkhäuser, 2016), 154.
16. Keller Easterling, 'Floor.dwg', *Cabinet* 47 (2012): 98.
17. Ibid. See also Keller Easterling, 'Floor.dwg', *Perspecta* 42 (2010): 135.
18. Castells, *Rise of the Network Society*, 443; Lyster, *Learning from Logistics*, 16–47.
19. Maxwell G. Lay, *Ways of the World: A History of the Worlds Roads and of the Vehicles That Used Them* (Sydney: Rutgers University Press, 1992), 43, 53, 45, 52 (pages in order of information appearance).
20. Keller Easterling, *Extrastatecraft: The Power of Infrastructure Space* (London: Verso, 2014), 162–9.
21. Cowen, *Deadly Life of Logistics*, 129–31.
22. Keller Easterling, *Enduring Innocence: Global Architecture and Its Political Masquerades* (Cambridge, MA: MIT, 2005), 100.
23. See for example Dan Howarth, 'Oiio Envisions Cars as Transparent Pods That Move Both Horizontally and Vertically', *Dezeen*, December 19, 2017, https://dezeen.com; See also Easterling, *Enduring Innocence*, 111.
24. Richard de Neufville and Amedeo R. Odoni, *Airport Systems: Planning, Design and Management* (New York: Mc Graw Hill Education, 2003), 498.
25. John Elderfield, *Imagining the Future of the Museum of Modern Art* (New York: Museum of Modern Art, 1998), 191.
26. David Harvey, *Spaces of Global Capitalism: Towards a Theory of Uneven Geographical Development* (London: Verso, 2006), 119–26.
27. Linda Samuels, 'Reinventing Infrastructure: The 101 Freeway and the Revisioning of Downtown Los Angeles' (PhD dissertation, UCLA, 2012), 55.
28. Cowen, *Deadly Life of Logistics*, 14. See also Andrew Lakoff, 'From Population to Vital System: National Security and the Changing Object of Public Health' ARC Working paper no. 7.
29. Marc Augé, *Non-places: Introduction to an Anthropology of Supermodernity* (London: Verso, 1995), 103.
30. Castells, *Rise of the Network Society*, 494–99.
31. Harvey, 'Space as a key word', 123.
32. Jacques Rancière, 'Ten Theses on Politics,' *Theory and Event* 5, no. 3 (2001): 8–22.
33. Notably, the concert was to be held in memory of Pavlos Fyssas, who was murdered by members of the far-right Golden Dawn party in September 2013. See the website of Keratsini-Drapetsona municipality: https://goo.gl.
34. Superstudio, dir. *Supersurface: An Alternative Model for Life on the Earth*, Marchi Producioni, 1972.
35. LeCavalier, 'Restlessness of Objects', 90. LeCavalier cites the image from the army magazine *Army Logistician*, November–December 1983.
36. See example at wordreference.com.
37. Easterling, 'Floor.dwg', *Cabinet*, 98.
38. Lyster, *Learning from Logistics*, 148–75.
39. Ibid., 159–67.

40. Etymological notes synthesised from 1911 Encyclopædia Britannica 11th edition Volume 10, Slice 5. Accessed online, http://gutenberg.org; Etymology Online, https://etymonline.com.
41. Etymological notes synthesised from: Rebecca Lines-Kelly, 'Soil: Our Common Ground – a Humanities Perspective,' proceedings of SuperSoil: third Australian New Zealand Soils Conference, University of Sydney, 5–9 December 2004, and Etymology Online.
42. Carol P. Biggam, 'Grund to Hrof: Aspects of the Old English Semantics of Building and Architecture,' *Architectural History* 45 (2002):49, 51.
43. Lines-Kelly, 'Soil: Our Common Ground'; see also Daniel Hillel, *Out of the Earth: Civilization and the Life of the Soil* (University of California Press, 1992).
44. James Corner and Alex S. MacLean, *Taking Measures across the American Landscape* (New Haven: Yale University Press, 1996), 28; see also Carolyn Merchant, *The Death of Nature: Women, Ecology and the Scientific Revolution* (New York: Harper San Francisco, 1989).
45. Aaron Betsky, *Landscrapers: Building with the Land* (New York: Thames and Hudson, 2002), 7.
46. Robin Dripps, 'Groundwork', in *Site Matters: Design Concepts, Histories and Strategies,* ed. Carol Burns and Andrea Kahn (New York: Routledge, 2005), 59–92.
47. Corner, 'Terra Fluxus', 30–31.
48. Filippos Oreopoulos, 'The Terrain', proceedings of RR Radical Reading 1, Athens School of Fine Arts, 2016.
49. Clay Jetter, dir., 'Dan Barber,' on *Chef's Table*, Netflix, 12 February 2015.
50. Dripps, 'Groundwork', 71.
51. Corner, 'Terra Fluxus', 30.
52. Barbara Booth, Stephen D. Murphy, and Clarence J. Swanton, *Weed Ecology in Natural and Agricultural Systems* (Cambridge, MA: CABI Publishing, 2003); for definition issues, see Robert E. L. Naylor, 'What is a weed?', in *Weed Management Handbook,* ed. Robert E. L. Naylor (Oxford: Blackwell Science, 2002):1–15.
53. Dimitrios Alifragis, *The Ground: Generation, Properties, Classification* (Thessaloniki: Aivazi, 2008), 353–4.
54. Gilles Clément, 'In Praise of Vagabonds', *Qui Parle* 19, no. 2 (2011).
55. Jacques Rancière, *Disagreement: Politics and Philosophy*, trans. Julie Rose (Minneapolis: University of Minnesota Press, 1999): x. The floor and the ground are essentially in disagreement.
56. Easterling, *Enduring Innocence*, 39–62.
57. Gilles Deleuze and Félix Guattari, *A Thousand Plateaus: Capitalism and Schizophrenia,* trans. Brian Massumi (Minneapolis: University of Minnesota Press, 1987), 351–423, 474–500.
58. Corner and MacLean, *Taking Measures*, 25–38.
59. Deleuze and Guattari, *A Thousand Plateaus*, 475.
60. Clément, 'In Praise of Vagabonds'; Alifragis, *The Ground*.
61. Cowen, *Deadly Life of Logistics*, 126–7.
62. The way I understand active components in infra-structures resembles Easterling's active forms, *Extrastatecraft*, 73–81.
63. Manuel Castells, 'Grassrooting the Space of Flows,' *Urban Geography* 20, no. 4 (1999): 294.
64. Corner and MacLean, *Taking Measures*, 25.
65. Rania Ghosn, 'Move Along! There Is Nothing to See,' *Thresholds MIT Journal* 40 (2012): 33–38.

Biography

George Papam Papamattheakis is a postgraduate student of Urban Geography at the Harokopio University in Athens, Greece. He previously studied Architecture at the schools of National Technical University of Athens (NTUA) and Eidgenössische Technische Hochschule (ETH) in Zurich. George has worked on issues related to the architecture and geography of infrastructures, he has contributed to *Log*, *Clog* and *Cartha* magazines, the Lisbon Biennale of Architecture, and Bartlett's Lobby. He is the co-editor of the upcoming book *Misprint Athens: Toward a New Paradigm* (due 2019, published in Greek), a collection of texts and projects documenting the procedures of ΣΟΔΑ, a collaboration platform for graduate architecture students in the context of post-crisis Athens.

Territories of Equivalence: Objects of the Logistical Apparatus

Clare Lyster

Introduction

Whether we admit it or not, logistical flows are embroiled in our lifestyles. Priority shipping is common practice; messaging in real time with a friend in a remote location is taken for granted; millisecond transmission signals, such as those used by e-traders, are elementary and ordering goods with an app for home delivery within an hour is becoming routine. Every day we become more entangled with the convenient, yet increasingly abstract procedures of logistical regimes, from online shopping to shared infrastructure, and the corporate actors, from Amazon.com to Uber, that make them possible.

The space of logistics is a juggernaut and comprises many components. From transportation infrastructure (ocean freight lines, massive container ships, cargo planes, trucks and other autonomous vehicles) to fully contained urban areas (Special Economic Zones or SEZs); from architectural interiors (sorting facilities; fulfilment centres and delivery depots) to sophisticated software (algorithms, data capturing and identification systems); from virtual and real communication systems (fibre optics to WiFi) to technological equipment; and last but by no means least, political matters, in the form of soft labour laws and predatory employment tactics. The space of logistics is best described as a large multi-scalar assemblage, whose territory extends from the planetary (satellites) to the local (a doorstep). Furthermore, the many facets of logistics coexist and mutually energise each other, endlessly proliferating the madness and comedy that is at the centre of our lifestyles and that fuels the neoliberal machine in all its phantasmagorical forms, from efficiency to abstraction and from convenience to desire. Moreover, expeditious communication streams and synergies between all the parts amplify the logistical apparatus beyond the tangible and real, in such a way that it is no longer a comprehendible geo-spatial phenomenon but more akin an existential ecosystem – ecosystem that is subconsciously omnipresent but also one that is often nebulous and hidden from the users who interact with it (even without understanding what logistics is or how it works, one participates). As Gabrille Esperedy writes, when articulating the agency of metadata in our daily lives, in particular when we conduct Internet searches, 'few of us contemplate the algorithms when what we're after are the answers'.[1] One can be enmeshed in the space of logistics, yet at the same time one is alienated from it. In other words, one is simultaneously in and out of its space. It's there, but it's not really there.

In his recent book, English ecologist Timothy Morton, coins the term 'hyperobject' to describe large-scale spatial and temporal phenomena that have an impact on the earth. He argues that a significant feature of a hyperobject is that, although it is real and present, one cannot see or touch it. Hyperobjects, he writes, 'cannot be directly seen but can be thought of and computed and represented',[2] moreover 'we tend to think of them as abstract ideas because we can't get our heads around them, but that are nevertheless as real

as hammers'.[3] Morton's focus is on a particular set of hyperobjects – complex environmental phenomena, in particular, geological transformations of the earth's surface in the Anthropocene, that he believes will eventually cause the demise of the world. For example, global warming, which he renders a hyperobject because one knows it is present and understands its consequences but at the same time, global warming is not a completely legible convention. You cannot see it.

However, Morton goes on to explain that even within their opaque state, hyperobjects provide evidence of their existence, what he calls a 'footprint' or a 'manifestation'. This is best expressed as a sort of quantifiable clue in time and space that helps us understand the larger whole. For example, rising tides and more frequent storms are footprints because they provide demonstrable hints of global warming. Similarly, he cites soot found as far away as the Artic Circle in the late eighteenth century as a footprint of another hyperobject that is of interest to him (he focuses on hyperobjects with ecological consequences), industrialisation. So while a hyperobject may remain tenuous, immaterial and non-figurative, the footprint(s) provide a close encounter with it, awarding intimacy with an otherwise abstract apparatus.[4]

As a way to advance a discussion of logistics in design, I want to appropriate Morton's theory here, for the logistical apparatus might also be conceived as a hyperobject. First, not unlike global warming, logistics is a dark paradigm of industrial capitalism with significant geophysical consequences. International production combined with the world's insatiable demand for goods is an ecological crisis in itself when it comes to abuse of resources and systems of waste. Secondly, logistics is a large-scale spatio-temporal phenomenon that is simultaneously tangible and hidden, fathomable and abstract, real and virtual. You know it is there (when you order online or when your package arrives at your door) but you cannot really see it. Finally, logistics can be considered a hyperobject because it possesses footprints that allow relative closeness with the intangible procedures of its abstract operations. Think of them as momentary reminders or fragments that provide a glimpse of something bigger. For example, a FedEx envelope that holds your documents. The envelope, with its tag and codes is a footprint of the larger realm of logistics, in this case the exigencies of priority shipping. However not all of Morton's footprints are necessarily objects, in fact, the examples used above (rising tides and storms) suggest that footprints may also be processes, stories and environmental phenomena, or any inanimate entity.[5]

Logistical footprints

In the 1970s logistical flows became part of our daily routines, when many technologies invented and developed in the post-war era moved out of institutional think tanks and into mainstream use. For example, the barcode (placed on a pack of Juicy Fruit in 1974), early internet systems such as Arpanet (1969–1971), and Intel's Microprocessor (1971), to name but a few.[6] While perceived as novel artefacts in their day, these devices became early footprints between the public and the virtual world of information systems and product inventories. In the ensuing forty years, we have experienced rapid transformation of the logistical, courtesy of a range of new technologies from satellite infrastructure to robotic systems, and these bring with them a whole range of associated footprints, which provide an interface with the entire circulatory system of logistics. In particular, I'm referring to the gadgets, objects and devices in our cities and in our homes that augment our interaction with logistics and that make their operations legible within the everyday.

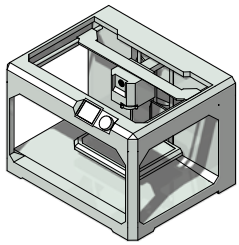
So far, we have seen some reportage on the objects of logisticalisation. Marc Levinson's research on the intermodal container, the paradigmatic 'gizmo' of logistics is an important precedent

here as a lens through which to decode the logistical, and other scholars have looked at port terminals, fulfilment centres and distribution depots.[7] While significant in the larger circuits of flow, these logistical manifestations exist in the manufacturing realm and are not readily found in our everyday surroundings so they are not necessarily the footprints of logistics that the public interacts with on a frequent basis. It might therefore be useful to explore the logistical objects that are increasingly making their way into the spaces we inhabit. One might think of, AI devices known as home assistants, such as Amazon Echo or Google Home, reading platforms such as the Kindle; or home shopping instruments such as Amazon Dash. One might also think of routers and domestic robots (from Romeo to Gita) or objects controlled by apps that can feed your dog (The Furbo), to other forms of smart equipment that record data in the home. Other ready examples include 3D printers, or Velop, a gadget that expands the range of your WiFi so you can work in your garden, personal accessories from Google glasses to Fitbit watches to RFID tags in clothing fibres. One might also include the objects of online commerce, from shipping envelopes and packing boxes that clog up your kitchen, to transportation vehicles, such as drones and delivery trucks that are found in our cities and neighbourhoods.[8] These are the artefacts, devices and procedures that we rub up against each day and they offer a fleeting access to the larger abstract world of logistics. These are 'the stuff' of logistics and where global flows hit the ground in very specific ways. [Fig. 1]

Attempting to understand larger phenomena, or the world in general, from the perspective of objects has recently become a recognised alternative approach to metaphysics by scholars and artists in a variety of disciplines. Object Orientated Ontology (OOO) is a philosophical movement based on the fact that objects are not as we perceive them – inert material things with shape and function – but are autonomous entities that can exist outside of human agency.[9] In OOO, humans and objects share equal status and all inanimate entities have a consciousness. In other words, like humans, objects are beings. This perspective both builds on, yet differs, from Heidegger's philosophy of tools, which argued that a tool's being was established through (human) use – what he identified as a 'readiness to hand'.[10]

That an object's meaning is established through the subject's personal and constant interaction with it, renders the object dependent on human thought. However, at the same time, since this dependency occurs at the level of our subconscious, our reliance on tools is taken for granted and their meaning is withdrawn, unless a tool breaks, in which case we fully understand its agency. Furthermore, Heidegger believed that objects do not exist in isolation but are part of a larger system of relations, which provides a context for their use. For example, our understanding of a knife in a kitchen is different than if we encountered a knife elsewhere.[11] OOO abolishes the subject-object hierarchy that is the foundation of many anthropocentric philosophical traditions and claims that objects have a hidden agency beyond our comprehension and outside their material attributes and use, a concept that is gaining traction under a larger label, titled 'Speculative Realism', which includes not just literary and philosophical works (such as OOO) but also works of visual art that represent a post-humanist world through emerging technological processes and machines (these are often jarring and uncomfortable depictions) or deploy objects as a way to look at the world beyond human agency, on the assumption that humans have lost the capacity to make decisions about their own world.[12]

Both Speculative Realism and OOO encourage new ways to express and discover how technology, meta-systems and objects (including humans) interact to decentre traditional anthropocentric constructs. Not unlike actor-network theory, it argues for a social theory through relationships



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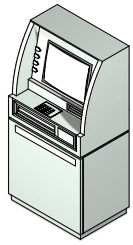

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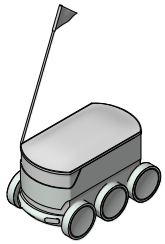

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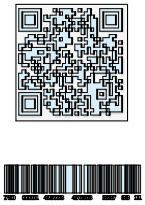

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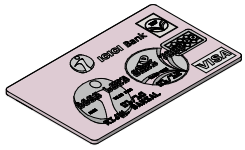

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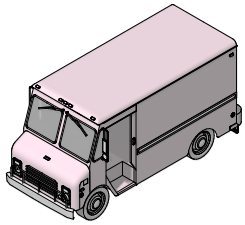

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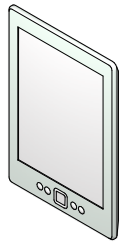

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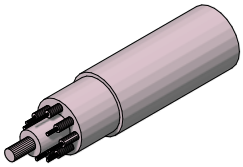

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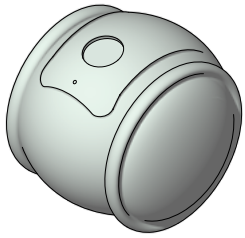

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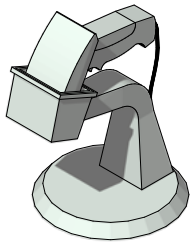

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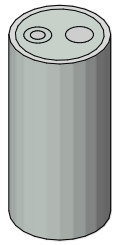

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Fig. 1: A catalogue of some of the more popular logistical objects that we encounter everyday.
Clare Lyster.

1. 3D printing machine
A machine for *Additive Manufacturing*. Allows for the printing of 3D objects from a computer file. Despite its elimination of manufacturing jobs, it promises to cultivate local production and custom fabrication. No need to wait for delivery, just print what you need, when you need it. Invented by Charles Hull who issued a patent for a stereolithography apparatus in 1986.

2. Automated teller machine (ATM)
Early example of an automated interface in the banking industry from 1967. Otherwise known as a cashpoint. Early machines used tokens rather than a card and PIN number. Offered convenience, speed, self-service and 24-hour access to banking that is now taken for granted. Earliest technological platform to enter the city.

3. Cargo robot
Semi autonomous, mobile container that moves around the city. Currently being tested by food delivery companies. One popular design is a six-wheeler by *Starship Technologies.* Characterised as a cooler on wheels, these little gizmos use AI technology to navigate. Controlled by cameras and sensors and traveling at six kilometres per hour, they are designed to deliver goods locally in fifteen to thirty minutes within a three-kilometre radius. Robots have been active in industrial and hospital settings for a while but now might be your new pet.

4. Communication satellite
Data network, enabling high speed communication across long distances. Involves receivers, transmitters and a relay, which is typically a computer controlled man-made machine in orbit. Works courtesy of uplinks and downlinks between the earth stations and the relay. Orbits range vary from low-earth orbit (2,000km); medium-earth Orbit (20,000km) and high-earth (36,000km +). According to *Center for Space Standards and Innovation* there are currently about 3,500 operational satellites.

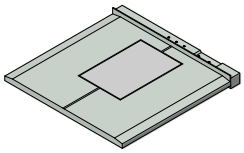
5. QR code
Quick Response Code comprising black squares on a white background. Same principal as the barcode but holds more data since information is contained horizontally and vertically.

6. Barcode (UPC A encoded barcode symbol)
The twelve and thirteen digit UPC barcode is the most familiar barcode pattern used today. Comprised of seven vertical blocks of black and white lines. It was invented by George J. Laurer (with help from William Crouse and Heard Baumeister), an engineer at IBM in 1973 marking the dawn of automated management systems in popular culture.

7. Credit card
A standardised plastic card measuring 8.56cm x 5.398cm that is used to make payments. Initiated by B*ank of America* in 1958 and computerized as a network in 1973. The magnetic strip was introduced in 1979, allowing data to be stored electronically. This has recently been replaced by a chip for added security.

8. Delivery truck
Specially fitted transportation vehicle for ground delivery. Augmented by route planning software to optimise delivery (or pick-up) sequences.

9. E-reader
A small hand-held tablet-like digital device for the purpose of reading e-books, magazines and newspapers that are downloaded via Wi-Fi from a network. The most popular example, is Amazon's Kindle (2007). In April 2017 there were over 6.9 million titles available in Amazon's US Kindle Store (according to Wikipedia and Amazon.com). Not quite the *Library of Congress* but getting closer everyday.



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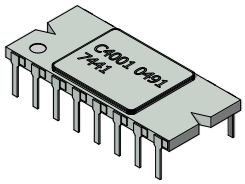

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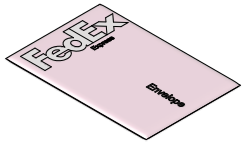

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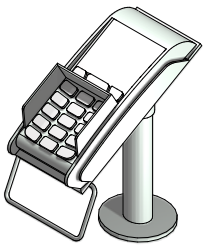

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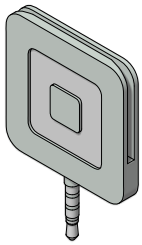

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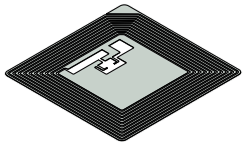

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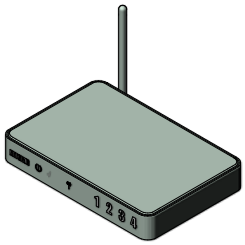

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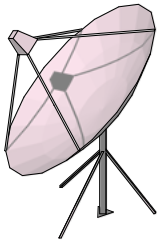

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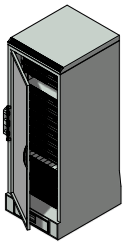

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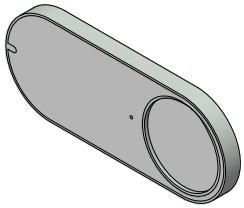

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10. Fibre optic cable
Communication conduit comprising thin strands of plastic or glass (fibres) along which data is transmitted via light beams. Suitable for high speed transmission over long distances. Embedded in the ground or laid on the ocean bed.

11. Gita
A personal cargo robot (cargo carrying system). Holds up to twenty kilograms with a battery life of eight hours.

12. Handheld scanner
Reads a barcode by scanning a laser light over the black and white lines in the code. Some are pocket-sized and wearable. Aids in the tracking and management of product inventories.

13. Home assistant
Home Assistant is an automatic platform that enables one to control devices in the home, as well as ask questions, receive weather updates and so on. It takes the shape of a small object the size of a teapot that sits on the kitchen counter. Amazon's version, called the *Echo,* uses a life-like voice system. Voice activated. Runs via command and AI systems.

14. Laser scanner
Reads a barcode by scanning a laser light over the black-and-white lines in the code. Found in supermarkets and grocery stores. Aids in the tracking and management of product inventories.

15. Microchip (Intel 4004)
Small central processing unit (CPU) invented by Federico Faggin, Intel Corporation, 1971. It could perform 92,000 instructions per second and was carved from a single piece of silicon. Allowed the commercial production of small-sized computers.

16. Packing box
Prefabricated heavy-duty paper or paper board or corrugated fibre-board container. First used in England in 1817.

17. Packing envelope
Standardised one-rate package size (24cm x 32cm) used for priority shipping by a range of couriers.

18. Point-of-sale terminal
Credit card reader. Popular from the 1980s onwards. Replaced the Zip Zap machine. That took an imprint of a card instead of reading the magnetic strip.

19. Portable point of sale
Small gadget that attaches to a smartphone enabling an individual or small business to process credit card payments. For example, Square.

20. Radio frequency identification tag (RFID)
A small labelling system that tracks and collects data to trace objects. Used in combination with a data network and a reader, for example, the chip on a credit card. A typical tag (chip) can hold sixty-four characters.

21. Router
A device that receives data through a phone line and then converts that data into radio waves to be picked up by your computer, smartphone or games console and transmitted into internet data again.

22. Satellite dish
An instrument that receives or transmits information from a communications satellite in the form of radio waves.

23. Server
A centralised CPU shared by one or multiple computers (clients).

24. Shopping wand
Personal hand held smart device that allows one to order goods online by saying the word or scanning a barcode. Amazon.com has a prototype called Dash. Part of a smart network to streamline supply and demand.

25. Smartphone
Handheld communication device that works on radio waves/frequency and an internet connection. For example, the Apple iPhone (2007) or the Samsung Galaxy (Android). Developed from early mobile phone technologies (such as that perfected by Motorola in 1973).

that exist between things and systems that are not necessarily managed or controlled by human thought.[13] It is in this context that Morton positions his analysis (meaning) of the hyperobject. He writes, 'it will become increasingly clear that hyperobjects are not simply mental (or otherwise ideal) constructs, but are real entities whose primordial reality is withdrawn from humans'.[14]

While a report of object theory is far beyond the confines of this article (and this author), nonetheless, whether you believe OOO is philosophy or a mere intellectual trend, it is a constructive schema to help us theorise the space of logistics, which promises (if it is not already promulgated), a post-human ecosystem, where automated objects and machines are slowly replacing individual agency at all levels and establishing themselves beyond human comprehension. Moreover, OOO is especially helpful in contemplating the increasing range of smart objects – logistical gadgets and gizmos that now inhabit our spaces, in particular, to comprehend a world where humans and gadgets influence each other on equal terms, or even, as artist Eduardo Navarro points out, a world where objects can even exert influences on each other. This is clearly illustrated by Amazon, who filed a patent in November 2017 for a 'voice sniffer' algorithm that would detect 'trigger' words in human speech and store them for target advertising. This means that unbeknown to you, your Amazon Echo might be listening and using your own diction to influence your decision making. In this case, logistical objects are monitoring what you say and communicating this knowledge to other entities.[15] This comes as no surprise, since logistical objects already overlap and talk to each other, so to speak. Think of the object communications required to perform a single online purchase from order to delivery (home computer to data cloud to algorithm to robotic picker to cardboard box to truck to doorstep). Think what's involved in ordering your groceries via PeaPod, having food delivered, or talking with a friend on social media. The gadgets and devices automatically work in combination to perform larger tasks.

In identifying and visualising some of the common footprints of logistics, it might be worthwhile here to refer to the work of writer and artist James Bridle, who in 2012 coined the term The New Aesthetic, which has emerged as a new visual art movement. Bridle began by documenting photographs of technological devices and their processes on a micro-blog via Tumblr. These images were what he called a visual shorthand to represent society. For him, broadcasting visual evidence of technological systems was a way to explain how virtual procedures are manifesting themselves in the physical realm. His work focuses on using images of a range of footprints as a way to understand what is going on in the world around us. In a much-quoted article on the topic in *Vanity Fair*, Andrew Blum describes Bridle's work as the way that artefacts of a particular era are removed from their context and deployed as cultural icons and aesthetic objects, like Warhol's soup can or Duchamp's urinal, but Bridle offers a more robust motive. He writes:

> So for me it's not about the future, it's simply about encouraging a more inquisitive interest in the present. If I have a fear it's that people simply do not analyze the systems around them. We increasingly design for an illegibility in technology – we try and make it obscure and distant and as seamless and invisible as possible. It makes it very, very hard to be an actor in the world, to have an effect politically or personally, if you're being acted upon by systems you don't recognize. My hope is that there is better thinking and education about technology so that doesn't happen.[16]

Bridle's pursuits have spawned an entire art movement based on technological imagery. His *Drone Shadow 002* outside a gallery of the Istanbul Design Biennial exhibits the darker forces of new technologies, that plays to the dystopian theories of OOO, a world of smart objects dominating human agency.

Deploying the visual language of logistics is making its way in wider circles. The fashion house Chanel used data storage servers in their window display in 2017, and this year Prada recreated the interior of a warehouse for its fashion show in Milan. Male models strutted the runway in helmets and shiny industrial uniforms exuding a robotic vibe. It seems that footprints are not just tools to decode but logistical objects are fostering a fully fledged aesthetic style. But this is no real surprise. Architects and designers have consistently borrowed industrial aesthetics to rethink the form of products, interiors and furniture. Whether this was machine aesthetics (Le Corbusier's Pavilion de l'Esprit Nouveau, 1925), factory appeal (the Eiffel Tower, the Crystal Palace), a streamlined appearance (The work of Raymond Loewy and Norman Bel Geddes),[17] biomorphic forms (Isamu Noguchi) and, or, military methods (the Eames's).[18] That Le Corbusier described his 1925 pavilion as a 'machine' for living in and the contents as 'domestic equipment' is also helpful here. Abandoning symbolic characterisations of household artefacts in favour of conveying them as standardised tools directly aligned the home with spaces and processes of industrial production (the house was a factory). Today, some of the logistical footprints mentioned above are to be found in the home. Perhaps it is here that the so far fragmented narration of logistics, hyperobjects, footprints and objects is best interwoven as away to explore the implications of logisticalisation for space.

Objects and territory

> I had, therefore, to go back to the sources, as I could not hope to understand the effects of mechanisation without knowing, in outline at least, its evolution. (Giedion, 1948)[19]

Understanding the home from the perspective of industrial gadgets (or gizmology) has a long history in architecture from Sigfried Giedion to Reyner Banham to the Italian Design movement in the 1960s and 1970s, a quick summary of which might be useful here as context for our contemporary situation.

Giedion's encyclopaedic index of advances in mechanisation in various realms (from industry to the home) was a tool to comment on the philosophical effects of mechanisation on space and on society. It was an alternative history of architecture that emphasised the transformation of space from the perspective of advances in mechanised equipment. Of particular interest is his commentary and presentation of the objects of industrialisation that changed the interior space and management of the home, for example, the oven or the bathtub, which served to standardise room dimensions. Giedion was criticised for overly metaphysical interpretations of the objects of industrialisation in arguing that our reliance and sometimes nonchalant (he uses the word neutral) relationship with these objects served to illustrate that mechanisation was as much an epistemological discussion as it was a technological one. Beyond improving human comfort and eliminating the drudgery of work, conceiving the world through the objects we use might also result in destructive associations. He uses advances in how animals were slaughtered as a case in point, highlighting how standardised killing methods could become so widespread and accepted.[20] Nonetheless his integration of industrial objects with larger forces in society and putting forth a theory of design from the perspective of everyday objects is a useful precedent here.

Reyner Banham's seminal essay 'The Great Gizmo' published in *Industrial Design* in 1965, about the domestication of the Wild West though technological invention, charts a range of industrial devices – from the radio transistor to the outboard motor – and how these contributed to the domestication of territory and more generally the growth of gadget culture in the US. In fact, Banham claims that what distinguished America from other parts of the world was its incorporation of gadgets into

the home and the elevation of comfort as a result, citing technological inventions form the mason jar to air conditioning. He writes: 'Gadgets were what awarded a sort of indigenous domestic architecture not found anywhere else', and 'Americans believe in technology and that is where to look for the greatness of their domestic architecture … the American home being a shell in which the gizmos did the work'.[21]

But Banham is also quick to point out a linkage between gadgets and larger meta-systems, for example, he cites the Sears catalogue as the mechanism by which many of the gizmos he profiles were distributed, as if to imply that as gadgets developed, they became less independent and more reliant on the hyperobjects (in this case the mail order infrastructure of the Sears and Roebuck Corporation) that sustained and enabled their use in space. In 'The Home is not a House', published in *Art Forum* in the same year, Banham performs another act in gizmology, from the perspective of technological gadgets, this time through the lens of mechanical equipment in the home. That the domestic environment became a mecca for gadgets and gizmos that did all the work, led him to ponder if one needed the domestic shell at all. Francois Dallegret's image of cavemen in a bubble that accompanied the essay, perfectly illustrated the dematerialisation of space that resulted from advancements in the mechanical realm that led us to think that objects had the power to displace architectural enclosure.[22]

Later in the 1970s, post-war consumption changed the home in terms of the accumulation of stuff and new technologies, from the colour TV to the microwave. Consumer product design was very influential in the design disciplines (architecture, industrial and product design) and this was most expressly documented in the famous 1972 exhibition *Italy: The New Domestic Landscape* at MoMA in New York. The exhibition was organised along different categories of object making and object relations, from non-functional formal objects to furniture to industrial gadgetry and networked environments. Of particular interest are the installations that explored the impact of new technologies on domestic lifestyle. I'm thinking here of Ugo De La Pietra's 'Casa Telematica', designed originally for the show but subsequently developed over the next ten years for the Milan Triennale in 1983. Here, De La Pietra is attempting to integrate new audio-visual communication objects in the form of computer and video screens supported by a centralised data base. One prototype included an armchair with an embedded screen. Also featured in the show was Superstudio's Supersurface and the firm's corresponding video proposing a lifestyle devoid of any building in favour of an endless Cartesian grid – an energy network at different intensities, augmented when necessary by objects such as a car or a radio or a portable refrigerator that provided the fundamental services to the citizens of this alternative lifestyle. Here, object is not read as a status symbol or an artifact of materialism, but instead presented as a service item. Furthermore, the surreal montages are particularly useful (visuals that would not be out of place in Bridle's blog, *The New Aesthetic*) in communicating how these service objects and the meta-network that furnishes them would facilitate a nomadic lifestyle. The idea was certainly ahead of its time, because the notion of just objects and territory is now a completely plausible concept in the logistical era. Superstudio's digital nomads are now an actual phenomenon – just look at the countless individuals known as freelancers of the gig economy, who move around the world sans fixed abode, relying on global franchise networks (from WeWork to Starbucks) and fast broadband, accompanied by iPhones and portable servers, to sustain their roaming work/live lifestyle.

In summary, technological objects in different eras have either standardised space, displaced it, integrated it or completely superseded it. Within this genealogy, it would be useful to explore more

specifically the spatial implications of contemporary objects.

A theory of equivalence

A few years ago, I stopped at a small cabana-type hut on the side of the highway after being tempted by the promise of fair trade ground coffee, brewed by a local company. A cool young hipster type greets me and sells me an expensive beverage. It is not a problem that I don't have enough cash, for he presents a tiny square gadget measuring about a three-and-a-half centimetres and attaches it to his phone. In seven seconds I had paid for the coffee with a credit card. Not long after a friend produced the same item at a book launch when faced with the problem of selling books to non-cash-holding customers. Of course, this is all commonplace now as taxi drivers and waitresses use the tiny stamp-sized square thing to take payment. The Square Reader, invented in October 2013 by Jack Dorsey of Twitter fame is a portable point of sale used in conjunction with an app and by February this year was being used by over seven million customers. Square's credit card reader can be purchased for $7.99 and plugs into any hand-held device. The company's motto is 'accepting credit cards everywhere'. Today a card can be read in 3.2 seconds and the device (comprising a head and pin) was recently redesigned to read a chip.[23] This means that the head comes equipped with a tiny battery that extracts the pertinent (and secure) information from the chip on your card. According to an article in *Wired*, 'algorithms aim to keep the reader powered long enough to go through a busy day of business without needing to be charged'. In the future if PIN numbers become mandated in the US, then Jesse Dorogusker, head of hardware design at Square, hopes that customers will enter these into the host device, rather than include a keypad, so as to keep the head of the device as small as possible.[24]

The real interest here is not necessarily Square's business model: to serve small businesses and customers with low turnover – businesses pay a 2.75% rate per payment to Square for use of the system's software and the reader is free on signing up. Rather, Square offers complete mobility not to mention the benefit of DIY financing, although access to WiFi is required, which makes it reliant on a larger service network (hyperobject), which might be problematic for those living in Internet holes and locations with slow service. (In this way its not as smart or independent as the walkie-talkie, which Banham praises for being able to work in isolation without infrastructure). Square also lives up to American sociologist Daniel Bell's theory that technological items would continue to get smaller and smaller as the post-industrial society developed and when new knowledge based technologies would emerge. This seemingly tiny footprint, (a small unit of high performance, as Banham described his gizmos) that fits in your purse or back pocket allows you direct and automatic access to a larger stream of money flows.

Yet the Square card reader is only as smart as the other accoutrements that make it possible, evidence that logistical footprints work in unison with each other to function as a larger symbiotic ecosystem, that in this case ranges from the smart phone to the battery, from the algorithm to the app. In other words, objects catalyse other objects. Even the ubiquitous credit card that is used to make payments is a fundamental part of the ecology of logistical exchange. Introduced by Diners Club (who issued cardboard cards) in 1950 and then by American Express and Bank of America in 1958, the functionality of the card was expanded in conjunction with two computerised networks (what we know today as Visa and Mastercard) beginning in 1973. The magnetic strip was introduced in 1979, allowing data to be stored electronically, and this has recently been replaced by a chip for added security. Square is the latest development in a line of hand-held readers that became popular from the 1980s onwards, all based on the same principal, including

the old zip-zap machine that took an imprint of a card instead of reading the magnetic strip. (Try carrying that around in your purse).

Square provides the latest venue for automatic banking, although the bank as institutional space has been disappearing ever since its ancestral footprint, the ATM, was set in place, first in England in 1967 and later in the US in 1969, with the result that the bank was no longer the de-facto host for monetary exchange and financial functions.[25] Instead, banking as well as a whole litany of other public and commercial activities in our cities and our homes is now curated and accommodated by little gadgets and their affiliated infrastructure. For example, even an unremarkable edge of a highway is activated courtesy of a credit card, a miniature reading device and a good cup of coffee. A new relational triad emerges between the object (and its ecosystem), territory and user, one where all parts exist with relative equality to each other.

Logistics challenges our perception, expectations and our traditional concepts of space-making. Many of the footprints presented here blur the lines between architecture, furniture, utensils and living creatures. Some have sensory attributes, for example, the Amazon Echo is a twenty-two centimetre cylindrical smart speaker that connects to your home assistant service (Alexa) that listens and talks to you in a life-like voice. It can tell you about the weather, play music and answer questions. This ambiguity (or confusion) allows us to reflect upon the traditional metaphysical categories we employ when contemplating the relationship between objects and space. For example, think how strong the TV was in orientating the furniture in the living room and the resulting occupation of the space (everyone sat on the sofa together). Instead, today, we witness spatial atomisation as family members split up into their own micro-zones with an iPad or phone or tablet.

Moreover, logistics offers an opportunity to contemplate the new agency of objects within the narrative of automation and post-human agency. Just think of how the contemporary home works; AI devices take on human attributes; smart systems integrate manual functions (closing our curtains or turning on the heat) and deep learning algorithms make decisions for us. If industrial standardisation in the 1920s provoked Le Corbusier to present the house as a 'machine for living', then logisticalisation pushes the relationship between humans and processes of capitalist production even further. At least the house as a factory still recognised the dominant role of human control. Could it be that Graham Harman is correct after all in making us believe that in this era, objects now dominate?[26]

Not necessarily. For now, it might be more productive to contemplate OOO's thesis of equivalence more broadly – no hierarchy between subject, object and territory, for this produces a more polemical claim for architecture, that being a sort of hazy-spatial condition, where one categorical species does not dominate over the other. To this end, I would like to conclude with a short description of a project by Japanese architect Junya Ishigami, which provides a strong demonstration of this testimony.

Ambiguous Space is how Junya Ishigami describes his Kanagawa Institute of Technology in Atsugi, Japan. A large, universal, one-room space built with flexibility in mind, it is less a building and more a landscape. Three hundred and five narrow columns of varying dimensions are located field-like on plan with programmed space in between, carved out like voids or clearings in a forest, where students assemble and work. There is no subdivision or figural interiors, instead structure, furniture and trees (actual potted plants) share the floor plan that is now akin an occupied terrain. Here works of art, furniture, tools, air conditioning units,

equipment, trees, columns and students co-exist in a non-hierarchical, confetti-like distribution of bits. Activities cluster in the void spaces but overall there is a feeling of complete atomisation and uniformity between all the parts since everything is rendered object (humans and inanimate things). Furthermore, a neutral approach to materiality, a polished concrete floor, white gridded ceiling and a thin, almost fragile, glass enclosure that allows a direct relationship to the outside amplifies the effect of uncertainty. While explicit evidence of logistical objects is absent from the photographs of the interior, nonetheless, reading contemporary architecture through the lens of ambiguity – an impartial territory of objects, humans and landscape – is very useful as we try to come to terms with the spatial impact of logisticalisation in our midst.

Notes

1. Gabrielle Espredy, 'Building Data: Field Notes on the Future of the Past', *Places Journal* (September 2013), https://doi.org/10.22269/130923.
2. Timothy Morton, *Hyperobjects: Philosophy and Ecology after the End of the World* (Minneapolis: University of Minnesota Press, 2013).
3. Ibid.
4. Alex Blasdel, 'A reckoning for our species: the philosopher prophet of the Anthropocene', *The Guardian*, 15 June 2017, https://theguardian.com.
5. Morton ascribes the current ecological crisis to the limits and consequences of industrial capitalism, that he characterises as 'a primitive artificial intelligence', and he identifies the steam engine, invented by James Watts in 1784, as the dawn of man's problematic imprint on the earth.
6. More information on these early logistical technologies, and others, can be found in the book, Clare Lyster, *Learning From Logistics: How Networks Change Cities* (Basel: Birkhäuser, 2016), 1–15.
7. Mark Levinson, *The Box: How the Shipping Container Made the World Smaller and the World Economy Bigger* (Princeton: Princeton University Press, 2008).
8. I'd like to briefly explain the function of these gadgets for those not familiar with their agency. Many of these are currently used in the US and might not yet be familiar in other contexts: *Home Assistant* is an automatic platform that enables you to control devices in the home, as well as ask questions, receive weather updates etc. It takes the shape of a small object the size of a teapot that sits on your kitchen counter. Amazon's version, called the *Echo* uses a life-like voice system. The *Kindle* was the first popular e-reader introduced by Amazon in 2007. Currently it allows access to 6 million e-books. *Amazon Dash* began as a proprietary wand-like instrument that can be used to order goods via an online account. It now takes the form of a 'button' that automatically replenishes a particular item when needed. *Romeo* and *Gita* are domestic robots. Romeo is a humanoid robot that aids the elderly with normal everyday tasks while Gita is a smart luggage / cargo carrying system. *RFID* is Radio Frequency Identity Identification. In most cases this exists as a tiny tag that holds data, for example, the chip on your credit card.
9. Graham Harman, *Tool-Being: Heidegger and the Metaphysics of Objects* (Chicago: Carus, 2002), 15–49.
10. Ibid., and for the original definition, see also, Martin Heidegger, *Being and Time*, (New York: Harper and Row, 1962 [1927]).
11. Ibid.
12. Examples here include work by Australian media artist Patricia Piccinini, who depicts the consequences of biotechnology, or the Cyprus-born performance artist Stelarc, who incorporates virtual reality and robotics in his work. I would also include the work of architect and film maker Liam Young in this genre. See Isabella Sandes, 'Post-Humanist Art and Speculative Realism', *Interactive,* https://interartive.org.
13. Actor-Network-Theory argues that nothing in the social and natural world exists in isolation but is part of a larger underlying network of forces and associations.

ANT articulates a social theory based on associations between people, objects, things, places and events (Actors), by exploring the relationships and networks between these human and non human actors. While the concept is attributed to French philosopher and anthropologist Bruno Latour, it has been adopted more broadly to understand the transformation of human agency in an ever complex digital environment, in particular, how emerging technologies, communication infrastructure, automation and metadata intersect with human agency to restructure social space.

14. Morton, *Hyperobjects*, 15.
15. Sapna Maheshwari, 'Hey, Alexa, What Can You Hear? And What Will You Do With It?', *The New York Times*, 31 March 2018, https://mobile.nytimes.com.
16. Andrew Blum, 'Children of the Drone', *Vanity Fair*, June 2013, https://www.vanityfair.com). James Bridle, *New Dark Age: Technology and the End of the Future,* (London: Verso, 2018).
17. These categories were originally provided by the architectural historian Richard Guy Wilson. Richard Guy Wilson, Dianne H. Pilgrim and Dickran Tashjian, *The Machine Age in America, 1918–1941, (*New York: Brooklyn Museum, 1986).
18. The Eames fabrication of moulded plywood medical splints for the US Air Force in the 1940s informed the design and production of their famous LCW Chair of 1952.
19. Sigfried Giedion, *Mechanization takes Command: A Contribution to an Anonymous History,* (W.W. Norton and Company, 1948)
20. Bryan E. Norwood, 'Sigfried Giedion (2013) *Mechanization Takes Command: A Contribution To Anonymous History*. Minneapolis: University Of Minnesota Press**',** *Culture Machine* (2015) https://culturemachine.net.
21. Reyner Banham, 'The Great Gizmo', *Industrial Design* vol. 12 (September 1965): 48–59, also published in *Design By Choice*, ed. Penny Sparke (London: Academy Editions, 1981), 108–14.
22. Reyner Banham, 'The Home is not a House', *Art in America* vol. 2 (April 1965): 70–79.
23. 'Squaring The Circle That Is Square', *Pymnts.com*, 17 April 2017, https://www.pymnts.com.
24. Marcus Wohlsen, 'Square Bets Big on Next-Gen Credit Card Tech', *Wired*, 30 July 2017, https://wired.com.
25. Carolina A. Miranda, 'The Unbearable Awkwardness of Automation', *The Atlantic*, 13 June 2018, https://theatlantic.com.
26. Graham Harman, *Object-Oriented Ontology: A New Theory of Everything*, (London: Penguin Books, 2018).

Biography

Clare Lyster is an architect, writer and Associate Professor at the University of Illinois at Chicago. She is author of *Learning From Logistics: How Networks Change Cities* (Birkhäuser, 2016) that explores the implications of logistics for architecture and urbanism. Her research on the topic has been exhibited at the Lisbon Architecture Triennale (2016) and The Seoul Biennale of Architecture and Urbanism (2017).

The Zone in Reverse: Logistical Power and the Gaza Blockade

Francesco Sebregondi

Introduction

What are the blind spots of a view of logistics as 'capital's art of war'?[1] This lapidary definition can be said to encapsulate the primary angle of critique used in much of the recent, humanities-based scholarship on logistics.[2] Undeniably, logistics plays a pivotal role in the current model of capitalism; as such, its operational logic increasingly sets the rules for the restructuring of spaces and conditions of labour all along a world-encompassing supply chain. Yet this fact alone does not immediately entail that the field of operations of logistics can be strictly reduced to capitalist dynamics. Could it be that, in order to formulate an effective critique of logistics, one needs to venture beyond the horizon of capital?

Paradoxically, it is the relative success of a major political mobilisation around and against logistics that prompts us to pose this question. On 2 November 2011, about twenty thousand protesters marched into the port of Oakland – the fifth busiest container port in the US – causing a total shutdown of its activity. Widely discussed in the critical literature on logistics, the blockade of the Port of Oakland is often described as the most significant instance of the Occupy movement, because of the actual disruption it caused to the material flows of transnational capitalism. Among circles of the radical left, it has led to a discourse praising 'a move from the strike to the blockade' as a new paradigm of anti-capitalist action in the globalised condition.[3] It would, of course, be foolish to pretend assessing, in general terms, the strategic character of the localised actions of logistical disruption that have multiplied around the world in recent years; their degree of success, indeed, is to be measured first and foremost against the particular demands of the workers and activists undertaking them. Rather, what is perhaps worth questioning here is the conceptual schema that seems to emerge, more or less explicitly, from a number of attempts at theorising such actions: whereby logistics = flow = capitalism, therefore blockade = interruption = resistance.[4] Here it should suffice to mention the example of the Occupied Palestinian Territories, and of the blockaded Gaza Strip, in particular, to start disrupting such a schema. To anyone familiar with the situation in Palestine, the recent entry into circulation of terms like 'occupy' or 'blockade' as key slogans of a self-proclaimed global movement of emancipation may have sounded, to say the least, odd. What it raises is not merely a branding problem, but rather a conceptual one. Unless key sites of struggle over mobility and circulation, such as Palestine, are carved out as exceptions to an otherwise global rule of logistical capitalism, practices of obstruction and interruption cannot immediately be held as effective tactics of counter-power.

The main limit of the current critique of logistics that this essay sets out to discuss can be articulated as follows: due to an excessive theoretical focus on its instrumental role within globalised capitalism, logistics tends to be only considered in terms of the flows that it releases and speeds up; in turn, this tendency entails a conceptual decoupling of

logistics from questions of restricted mobility, isolation, or confinement. As a result, the current critique of logistics can be said to ignore a vast and significant domain of logistical operations. What would it mean to understand logistics as operating as much on the fostering of certain flows as on the hindering of others?

With a view to addressing this question, the essay turns to the blockaded Gaza Strip. While it is rightly perceived as a place of closure – one that is essentially bypassed by the flows of goods that logistics is meant to orchestrate – Gaza is nonetheless proposed here as a paradigmatic logistical site; in the process, the essay outlines a reconstruction of the problem of logistics as seen through the prism of Gaza. At its core is a call to approach processes of enclosure, isolation, and restriction of mobility as logistical operations — in fact, as a mirror image of the fast-tracking operations that logistics is primarily known for.

To develop this argument, the architectural perspective becomes critical. Indeed, an examination of the Gaza blockade as a material process reveals that the spatial and technical infrastructure used to obstruct circulations into and out of Gaza shares much in common with the one tasked with lubricating the flow of goods and labour around the globe. The essay proceeds by setting Gaza's architecture of confinement against the 'architecture of flow' that typically characterises logistical sites around the world.[5] The material connections that are identified in the process form the basis upon which the proposed revision to the problem of logistics is articulated. The essay is thus structured as follows. A first section examines the particular relation between war and logistics that emerges from Gaza's recent past. A second section addresses the reversibility of the logistical apparatus through a reading of Gaza as a zone in reverse. A third and final section turns to Gaza's border crossings with a view to discussing the terminal as the architectural paradigm of logistics. The conclusion returns to the notion of logistical power used throughout the essay, from the perspective of the expanded critical frame that it has outlined in the previous sections. [Fig. 1a, 1b]

War as the continuation of logistics by other means

In 2005, Israel launched a unilateral Disengagement Plan, which resulted in the withdrawal of the military positions and the dismantlement of the settlements it had established inside the Gaza Strip since 1967. It is no longer necessary to argue that this disengagement did not end the occupation of Gaza, but rather inaugurated an occupation of a new kind. In parallel to the disengagement process, the concomitant establishment, in 2007, of a drastic international blockade has turned Gaza into an experimental laboratory of colonial governance, where 'Israel fine-tunes a dubious balance of maximum control and minimum responsibility'.[6] Rather than marking the boundaries of Israel's territorial sovereignty, the blockade thus forms the primary infrastructure of the regime of power currently deployed over Gaza.

The sea, land, and air blockade of the Gaza Strip has now entered into its second decade. By reducing the inflow of life-sustaining resources to a bare minimum for the survival of its two million captive residents, it created a structure of subjugation that is unparalleled around the world.[7] Unlike a medieval siege, the purpose of the blockade is not to completely cut off the supply lines of the warring citadel of Gaza up to its final capitulation. Almost every day, some goods, some supplies, and to a lesser extent, some people do cross the border of Gaza in either direction. Such flows ensure the survival of an ever-growing population living on a narrow strip of land that has been rendered practically unfit for any form of productive economy. For this reason, the blockade could, at least in principle, last indefinitely.

The approval or denial of any crossings of the Gaza border is the remit of COGAT (Coordination of Government Activities in the Territories), a unit subordinate to Israel's Minister of Defence and commanded by a Major General of the IDF. Every day, via its official Twitter account, COGAT posts detailed statistics about the number of trucks it allowed into Gaza, the total quantity of goods they transported in tons, or the number of ambulance crossings it allowed.[8] As an inexpensive public relations campaign, these daily tweets perform two distinct tasks. The obvious one is to downplay any allegations that Israel is strangling Gaza, by minimising, in the eyes of the general public, the degree of restriction to the flow of goods and people imposed by the blockade. The other one reveals, and in fact affirms, the real purpose of the blockade as a regime of power. Rather than simply obstructing passage, the closure of the Gaza border enables, above all, a form of centralised and meticulous oversight over distributed circulations – rendered by the detailed figures that COGAT is so keen to tweet. With the establishment of the blockade, the Israeli authorities have gained the ability to channel, monitor, and modulate the flow of everything going into and out of the Palestinian enclave. Parallel to the indefinite suspension of customary political, juridical, and diplomatic processes, logistics has thus turned into the main mechanism by which Gaza is effectively governed.

Since 2008, Gaza has endured three wars – which caused thousands of civilian casualties together with the recurrent, extensive destruction of its built environment.[9] Not only has the blockade constituted the structural trigger of each of these wars, but also, arguably, their primary stake. The case of the latest war makes this point particularly clear. Aptly code-named 'Protective Edge', the 2014 Israeli military operation in Gaza had as its declared objective the destruction of the network of tunnels which had been dug in the subsoil of Gaza in response to the blockade.[10] By opening up channels of unmonitored communication across the border, those tunnels posed indeed a fundamental – one may say topological – threat to the exercise of a mode of power based on the control of all forms of circulation. The army was thus called on to remodel a contested terrain – to fill in the dangerous cavities through which Gaza was quite literally undercutting Israel's authority.

The army's role in shaping the spatial conditions by which Gaza is governed can be identified in many other instances and extends beyond the timeframes of its mobilisation for large-scale military operations. Another example is the permanent 'buffer zone' that runs along the internal perimeter of Gaza, and which considerably increases the fence's encroachment into Palestinian territory. Its thickness is variable – from a hundred metres up to three kilometres during military operations.[11] Regardless of the lines on a map, the territory where the people of Gaza can venture effectively ends where the army's bullets land; and it is through the regular shooting of anyone crossing that invisible line that the soldiers permanently posted along the fence remind the residents of Gaza of the current extent of the buffer-zone – or inform them of its new width.[12] This process has its exact counterpart on the maritime border of Gaza, where the limit of the permitted fishing area ebbs and flows according to how close to the coast the Israeli navy's ships are effectively patrolling.[13] Gaza's variable geography must thus be understood as actively enforced and violently modelled by the Israeli army, so as to constantly adjust the degree of tightening of the blockade. As a peak of intensity in this enduring economy of violence, war is employed as a radical instrument in the continuous process of conformation of Gaza's territory to the mode of power it is subjected to.

Manifesting a thorough blurring of the distinction between the military and civilian domains, the Israeli army is increasingly mobilised to build durable infrastructural projects, designed to upgrade the

security architecture of the Gaza blockade. Since the summer of 2017, it has been constructing a sixty-kilometre long underground barrier that runs all along the Gaza fence – the depth and detection features of which remain unspecified – with the objective of getting rid, once and for all, of the problem of the Gaza tunnels.[14] After it was deployed on the terrestrial, aerial, and maritime domain, the blockade's reach into the subsoil appears to complete Israel's project to hermetically seal off the Gaza Strip – except for the few gateways that remain under its total control.

Emptied out of any semblance of rule of law, the blockaded Gaza strip was opened up to the rule of logistics. Far from constituting a simplification of the legal structure of power, this process has rather led to a reconfiguration of its operational logic. The very etymology of our modern notion of logistics seems to echo this shift. While the term is commonly traced back to the Greek root *logos,* a number of linguists have stressed the etymological detour of the term through the Middle French *logis,* 'shelter for an army, encampment', itself from the Proto-Germanic *laubja* – 'shelter'.[15] It could be said that it is outside the *polis,* and along military campaigns, that logistics has departed from the logos of the law. With this shift, the main problem of power is no longer to *legislate*, but to *lodge*; no longer to posit a frame, but to structure a motion. Whether the moving parts of such overall motion shall be hastened or restrained depends on the objectives of any given logistical deployment.

From the outset, the blockade of Gaza has been designed as a tool of 'economic warfare'.[16] The severe reduction of all available resources was conceived by the Israeli authorities as a means to put pressure on the population of the Strip and lead to their ousting of Hamas. As revealed by the now infamous 'red lines' document, COGAT went as far as calculating the minimum number of daily calories required for every Palestinian in Gaza to survive without starving; based on the average figure of 2,279 calories per person, it inferred the maximum number of food trucks to be allowed into the enclave every day. In practice, over the past decade, this logistical obstruction has been regularly falling far below its own red lines.[17]

The same policy applies to other basic needs of the Gaza population – from electricity to fuel, water, or cement. Over time, the technical apparatus employed to channel the circulation of such indispensable supplies appears to be undergoing significant upgrades. Established in the aftermath of the 2014 war, the Gaza Reconstruction Mechanism (GRM) is a data-driven logistical framework regulating the inflow of construction materials into the enclave.[18] For every single building project, an application must be submitted electronically that includes the details of the applicant, the exact location of the building, the purpose of the construction, and the amount of materials requested. Assembled and maintained by the UN with a distant involvement of the Palestinian Authority, the GRM database is then regularly reviewed by the Israeli authorities who approve or reject projects, thereby determining which packets of materials will be allowed into the enclave and which ones will be refused. As such, the GRM doesn't only support the continuation of the broad logistical rule imposed on the population of Gaza; it also marks a significant increase of the resolution at which it can operate.

Manifested, most commonly, by the 'just-in-time' principle commanding the global supply chains of today, the rule of logistics also seems to produce its own temporality: that of a never-ending present. When the only objective of power is to prevent an impending catastrophe, its response is to postpone it indefinitely, without ever overcoming it; in the meantime, dwelling on the verge of a catastrophe guarantees permanent access to an array of emergency measures.[19] The offensive mode of warfare of yesterday used logistics in order to prepare for

a decisive event – victory or defeat – which would open up a new condition of politics. Today, the deployment of logistics as a mode of power in its own right consists in using all means necessary, including war, to organise an essentially defensive strategy: preventing a defeat, maintaining an advantageous status quo, keeping an inviable system running for as long as possible and against all odds. The blockade of Gaza crystallises this strategy.

The Gaza Strip under blockade points to an inversion of the classical relation between war and logistics – whereby war is turned into an instrument to support the durable enforcement of logistics as a mode of power. The purpose of the Gaza blockade is not to cut all ties with a political and territorial entity that has been declared 'hostile', but rather to establish a particular kind of control over it, based on the monitoring and regulation of all the flows that traverse it. In a movement that mirrors that of the Israeli Disengagement, the locus of power under the blockade shifts from the centre of the territory to its borders. It is indeed at the border – or rather, within a thick bordering apparatus – that the technical infrastructure necessary to the enforcement of the rule of logistics is situated. The key result of such logistical operations is a territorial differential, produced and maintained through the orchestration of a particular regime of mobility between an inside and an outside. But one may ask: which one is which? [Fig. 2]

The zone in reverse

Sprung out of the ruins of Mandatory Palestine, the Gaza strip is an accidental territorial entity – its geographical contours corresponding to an entrenching of the frontline of the Arab-Israeli war at the time of the 1949 cease-fire. As such, the Gaza Strip was born as a vast refugee camp and, in many respects, still is to this day. Throughout the period of its administration by Egypt, from 1949, and ever since its occupation by Israel, from 1967 onwards, the borders of Gaza have remained militarised. During the 1970s and 80s, the residents of Gaza were generally granted permission to leave the Strip, primarily to be employed as a cheap labour force in Israel and its settlements. Following Israel's revocation of all Gaza workers' permits in 1991, the first Israel-Gaza security barrier was built in 1994. The process of gradual tightening of the border, through both economic and architectural measures, led to the establishment of the blockade in 2007.[20] With it, the degree of permeability of the Gaza border has reached new lows; yet, as discussed above, it is never completely closed: rather, the general condition of obstruction makes every cross-border circulation a matter of vital importance, while providing vast leverage to the authorities that decide over what may enter or exit Gaza. The blockade does not undermine logistics; rather, the blockade is itself a vast logistical operation.

As a fenced-off territorial formation characterised by the special regime of circulation applying to everything that finds itself within its confines, the Gaza Strip is not unreminiscent of a zone – this essential territorial tool for the assemblage of transnational logistical networks.[21] While the zone and the camp are both common notions in architectural and urban theory today, they also tend to be approached as polar opposites and, as such, to be treated in separate literatures. Arguably though, the zone and the camp form each other's mirror image and, together, constitute the spatial product of the rule of logistics.

The zone is generally defined as a territorial entity hosted by a state while enjoying a special status in relation to the order of sovereignty normally applicable over that state's territory. Its particularity thus lies in its liminal condition, neither fully within, nor completely outside of the state. The plasticity of this legal and territorial status lends itself to a wide range of adjustments and exemptions from the constraints of the nation-state – particularly with regard to tax and labour laws – which makes the

zone an especially attractive base for transnational economic activities. With historical origins in the free ports of the Hanseatic league, the zone has turned into a crucial tool for the development and interconnection of global logistical networks. As an easily reproducible template, it functions as a spatial lubricant to the flow of goods, labour, and capital around the world, by creating a compact space where barriers to such highly valued flows can be radically lowered. Yet, in order to operate as a 'frictionless realm of exemption', the zone must be established as an enclosure, its spatial boundaries clearly delimited and, in most cases, materialised by an actual fence.[22] In apparent contrast with the narrative of freedom and openness that sustains its worldwide proliferation, 'the zone is often a place of secrets, hyper-control, and segregation'.[23]

When the zone is approached as the territorial paradigm of logistics – as the ultimate 'space of flow' – its material functioning as a closed and off-limit space tends to remain under-examined.[24] Conversely, as long as the camp remains predominantly framed as a singular exception, approached in static terms, with a focus on the regime of immobility to which it suspends those whom it encloses, what remains obscured is the essential, dynamic dimension of camps – by which 'a floating population [is] linked to the satisfaction of logistical demands'.[25]

About two thirds of the people living in Gaza are food insecure today. The UN Relief and Works Agency for Palestine Refugees (UNRWA)

> currently provides food assistance to more than 996,000 Palestinian refugees in Gaza, who do not have the financial means to cover their basic food needs… A further 245,000 food-insecure non-refugees, all falling below the deep poverty line, are targeted by [the World Food Programme] with food and cash-based transfers.[26]

As a result of the blockade, the internal economy of the Gaza Strip has collapsed; starting with food, the fulfilment of the most basic needs of the Gaza population is largely dependent on external inputs and foreign resources, delivered through the complex circuits of humanitarian logistics. For this reason, the blockade is to be understood as a logistical operation not only in terms of the circulations that it obstructs but also because of the ones that it sets in motion.

Now an established theoretical tradition, the understanding of the camp as the paradigmatic space of exception tends to focus on an absence.[27] By delimiting a space where the law is suspended, the camp would strip its prisoner subjects from their former rights and reduce them to a condition of 'bare life'.[28] Such focus on what is missing from a postulated normal picture tends to prevent one from seeing and describing what has actually emerged within the juridical void created by the state of exception, what new technologies have been deployed in place of a 'juridico-discursive' model of power.[29] Studies of contemporary camps and other 'states of emergency' point, in contrast, to the fundamentally logistical rationality mobilized by humanitarian governance, which tends to 'neutralize political choices by reducing them to simple operational measures'.[30] In order to maintain the regime of suspended immobility that it is designed to establish, the camp relies on logistics. One of the defining aspects of the camp is therefore its dynamic relation to an outside, by which the mobility that it prevents is coextensive of the one that it demands. In this perspective, the camp constitutes a paradigmatic logistical site as much as the zone does.

A diagram emerges: the zone carves out a territory from the normal sovereign rules with the primary aim of releasing worthy and valuable flows across its borders – those borders being controlled from within and tasked with preventing any infiltration; while the camp, also resulting from a local

Fig. 1a

Fig. 1b

Fig. 1a: APM Maasvlakte II Terminal entrance, Rotterdam, February 2018. Photo: author.

Fig. 1b: Kerem Shalom Terminal entrance, Gaza/Israel, September 2016. Photo: author.

withdrawal of the normal order of sovereignty, has the function of containing the circulation of entities considered unworthy or dangerous – its borders, this time, being controlled from without and tasked with impeding any exfiltration. Thinking through the symmetry of the zone and the camp, positing them as the products of the same logistical rationality, opens up a specific understanding of logistics. At a macro level, the logistical mandate of optimising the mobility of people and things is achieved as much through the fostering of valued flows as through the hindering of unworthy ones. All the while at a micro level, the operations producing an overall hindrance of mobility for primary logistical targets requires that a whole set of secondary circulations be activated; and conversely, the smooth flow of 'globally bound stuff' is always a function of strict measures of restraint and containment.[31]

Of course, the model conditions of a diagram never match the complexity of its particular actualisations. By positing the zone and the camp as two abstract spatial conditions that jointly manifest the implementation of a single mode of power, the abovementioned diagram underlines the essentially differential order of mobility that logistics orchestrates. Yet, in practice, the zone and the camp are neither opposite nor mutually exclusive conditions. Many special economic zones also function as actual labour camps for their migrant workforce;[32] and conversely, the advanced logistics that Gaza and other humanitarian sites depend upon reproduce a number of the characteristic functionalities of the zone.[33] In fact, once approached through the perspective of logistics, the zone and the camp reveal their essentially reversible character, 'gathering an interior at one moment and guarding against an exteriority in the next'.[34]

There are a number of cases of former military bases and detention camps around the world that have been turned into key logistical hubs – the security architecture of the former lending itself quite naturally to safeguarding the operations of the latter.[35] Yet one project in particular, sited in Gaza specifically, does far more than illustrating the reversible character of the zone and the camp; it actually leverages this reversibility as its core strategy of growth. Started in the aftermath of the 2014 war, 'Global Palestine, Connected Gaza' is a 'Palestinian private sector initiative that envisages Gaza as a globally relevant, knowledge based and resource efficient economy pursuing opportunities in high value-added services and niche manufacturing, trade and transportation'.[36] In other words, it is a project to turn Gaza into a zone. Unlike most of the NGOs and activist voices on the situation in Gaza, the project doesn't simply demand the lifting of the blockade, the re-opening of the Strip, and its territorial reconnection to the West Bank; rather, it sets out to repurpose the infrastructure of enclosure originally built to isolate Gaza, so as to create a region-sized, ultra-compact, smart gateway to the Mediterranean that would serve both Palestine and Israel. Instead of flattening the territorial differential that the blockade has generated, the project is about exploiting it by reversing it, thereby turning it into an asset for Gaza and for the wider region.

Needless to say, 'Global Palestine, Connected Gaza' is a highly speculative project. Considering the level of precariousness and instability in which Gaza finds itself today, with fifty-three percent of its population living in poverty, an average of four hours of electricity per day, a rate of environmental degradation that led the UN to declare it unliveable by 2020, and the permanent threat of another attack by the Israeli military, the very act of designing a detailed vision for a connected Gaza reaching as far as the year 2050 may, at first sight, seem rather foolish.[37] Yet after taking a closer look, one might read this approach as an attempt to reckon with the particular conditions of logistical power that have come to define the reality of the Gaza Strip for many years already.

The initiative starts, it seems, from the acknowledgement of an impasse: that of leaving the resolution of Gaza's permanent crisis to the formally recognised political authorities in charge of it. Funded by a consortium of Palestinian enterprises in the fields of construction, telecommunication, finance, or real estate, the project negotiates its way forward by establishing links and gaining supporters across a wide range of agencies, think tanks, and NGOs, both locally and internationally. The vision itself was developed in partnership with AECOM, one of the biggest engineering firms in the world, which specialises in the development of large infrastructure projects. And it is only retroactively that the project sought, and obtained, an endorsement by a governmental institution – in this case, by the Palestinian ministry of local government, based in Ramallah.[38] As such, not only does the project articulate, through the vision it proposes, a specifically logistical model of empowerment for Gaza; but also, the strategy that it deploys to reach this objective already seems to follow, in many ways, the very channels by which logistics turns into power. At times leveraging, at others by-passing established governmental authorities, the power of logistics is fundamentally distributed, hinging on the disposition of its heterogeneous components. Besides, as a mode of power, it is often more effective when it is not immediately recognised as such – a point that seems to underpin the relatively inconspicuous project of flipping the Gaza blockade on its head and turning it into a thriving zone.

As a territorial interface designed to channel valuable flows in an efficient and controlled manner, the zone works by offering a single, compact spatial solution to an array of logistical demands. The camp works in the same way, but with the reverse objective: an equally efficient spatial solution to manage undesirable flows and enforce a particular regime of (im)mobility. Products of the same logistical rationality, both the zone and the camp form a node within a wider network of circulation. Among the principles driving the secure and efficient management of such a network is a logic of centralisation of operational functions: as a result, circulatory flows that are omnidirectional and global in scope tend to be routed through evermore centralised nodes. Counterintuitively perhaps, the expansion of the reach of logistics as a mode of power is a function of the contraction of its nodes. In a fractal manner, that same process of contraction is central to the border architecture of both zones and camps, as well as, more broadly, to the architecture of logistics around the world. [Fig. 3]

Terminal Architecture

There are only two crossings that remain partially open along the Gaza border: at its northern tip, the Erez terminal – for pedestrians; at its southern end, the Kerem Shalom one – for all kinds of goods. With the establishment of the blockade, every cross-border circulation has been re-routed to Gaza's territorial extremities – located forty-five kilometres from each other – according to a binary human/non-human segregation. In total, two crossings to handle the needs of a population of two million: the Gaza terminals can only be described as engineered choke points.

The process of channelling all circulations through a minimal number of terminals, as witnessed in Gaza, mirrors a general tendency that is observable all over the world: from ships to seaports to cargo hubs, warehouses or (e-)distribution centres, the architecture of logistics is getting not only bigger, but also more polarised.[39] Contrary to much of the theoretical discourse from the early years of globalisation, which prophesied a demise of both location and distance as relevant variables in the 'space of flows' that was allegedly emerging, the logistical rationality made them ever more relevant.[40] With the rise of total cost analysis – a principle at the heart of contemporary logistics – every mile of transport, every square inch of warehousing, every minute of delay along an ever more tensed supply chain were

captured into a complex matrix of permanent calculation. The joint optimisation of the profitability and security of supply chains tends to translate itself, in spatial terms, into a process of aggregation of logistical operations: in the same area, under the same roof, behind the same fence. Operative at all scales, such a process of optimisation gives rise to the zone just like it leads to the terminal.

The Gaza blockade is a special kind of logistical operation, whereby the main target of the total cost calculus to be optimised is the minimisation of undesired mobility. At its core remains a principle of optimisation, with comparable spatial consequences to more common supply chain problems; yet the particularity of its strategic objective leads to unique operational conditions, as manifested by the Gaza terminals.

Permanently closed in 2007, the Karni crossing is nearly five times the size of the Kerem Shalom one and used to operate at an average capacity of 700 trucks daily.[41] Its location in close proximity to Gaza city, the urban core of the Strip, would make it an obvious choice to minimise the cost of goods transportation into and out of Gaza. Just as obviously, in a logic of economic warfare where such costs are primarily borne by the enemy, Karni was among the first casualties of the blockade. With all truck traffic forcibly re-routed through the much narrower Kerem Shalom terminal, between 2007 and 2010 the average number of truckloads entering Gaza daily fell to 80; for the Israeli authorities on the other end, it is easy to imagine how the cost of thoroughly controlling every truck delivering goods to Gaza plummeted, once they could manage it all from a single and compact terminal.[42] Importantly though, the estimated capacity of the Kerem Shalom terminal before 2010 was around 150 truckloads daily – which indicates that it was operated at just above half of its actual capacity. Due to mounting local and international pressure, in particular after the Mavi Marmara flotilla incident in May 2010, the Israeli authorities announced an 'easing' of the blockade in June of the same year. As part of it, the logistical capacity of Kerem Shalom was upgraded to 350 truckloads per day. Nevertheless, between June 2010 and December 2014, the actual average number of truckloads that entered Gaza daily was under 150.[43] After the thorough destruction of Gaza's built environment during the 2014 Operation Protective Edge, and the entry into force of the GRM, the number of truckloads admitted into Gaza – a large proportion of them carrying only construction materials to rebuild it – increased sharply to new average of 300 daily over the past three years; while again, a new upgrade of the Kerem Shalom terminal – funded by the European Union – has brought its actual capacity to 500 truckloads per day. Drawing upon its well-known technical expertise in the field of logistics, the Netherlands donated two high-tech container scanners to be installed at Kerem Shalom, so as to expedite security checks and facilitate cross-border trade flows at large.[44] Following much negotiation about how Israel would use them, the scanners entered into operation in 2015, yet again not at full capacity. While the scanners could technically handle truckloads up to two metres high, COGAT imposes that the total height of goods stacked on trucks for commercial shipments out of Gaza does not exceed 1.2 metres – increased to 1.5 metres in February 2016, for agricultural products only.[45]

From this brief dip into the mind-bending calculations by which the blockade is permanently recalibrated, the key figure to retain is the ratio between logistical capacity and effective throughput. Although highly specific to the context of the Gaza blockade, the way in which the Israeli authorities run the Kerem Shalom terminal can be read as a by-the-book implementation of the latest operational principle in global logistical management – namely, elasticity. Put simply, 'elastic logistics refers to the flexibility to expand and shrink capabilities to align with the demands within the supply chain during

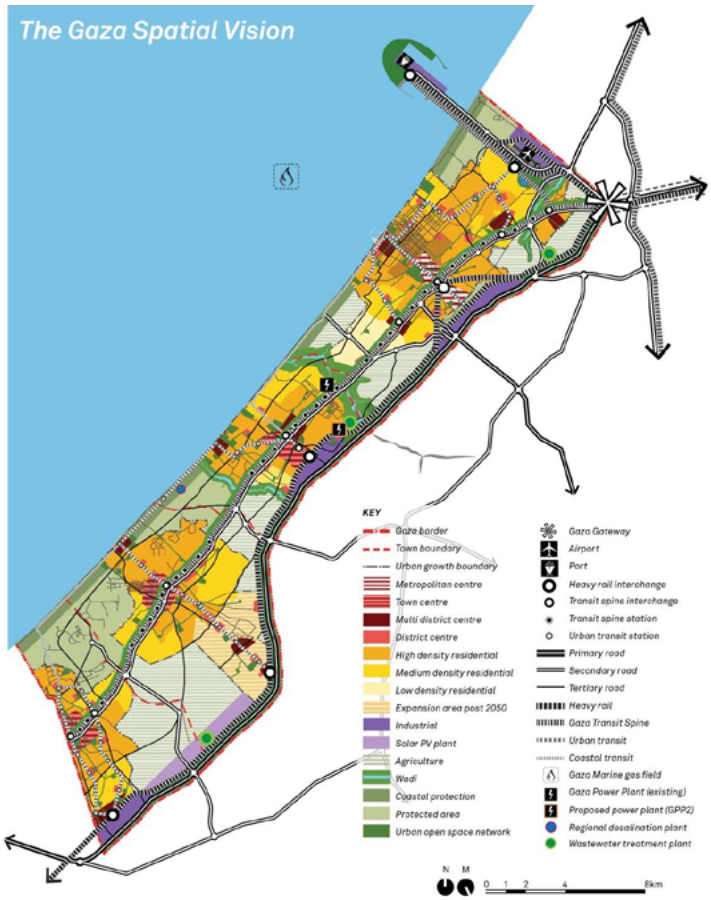

Fig. 2

Fig. 3

Fig. 2: 'The Gaza Spatial Vision' (2016–2050). From 'Global Palestine, Connected Gaza' full presentation (2016), available at: http://connectedgaza.com.

Fig. 3: View of a 3D reconstruction of the Erez Terminal, based on clandestine photographs by the Active Stills collective. Part of the Borderground workshop convened by the author (October 2016). Full documentation available at: http://borderground.info.

a given timeframe'.[46] In order to be able to quickly adapt to fluctuations in operational conditions – be they of economic or political order – elastic logistics recommends that every node of the logistical network be run at a throughput rate that leaves a substantial margin on both sides of the capacity spectrum. The optimised terminal, therefore, is not the terminal where the gap between capacity and throughput is closed, but rather, one in which any minor operational adjustment can quickly scale up and see its effects propagated on both sides of the circuits that it governs.

The Erez terminal, on the other end, pushes the elasticity principle to an extreme. In the summer of 2000, more than twenty-six thousand Palestinian workers entered Israel every day through the Erez crossing which, in architectural terms, was a simple checkpoint. With the outbreak of the second Intifada in September 2000, the number of crossings decreased sharply as the crossing was frequently closed.[47] As part of the 2005 disengagement plan, Erez was declared an international border terminal requiring, as such, a considerable upgrade of its security architecture. Completed in February 2007 at a cost of about thirty-five million dollars, the new Erez terminal is a vast, partly glass-walled complex that wouldn't look odd in an international airport. While its technical specifications make it capable of managing the crossing of forty-five thousand people daily, the entry into force of the blockade just four months after its completion meant that it never operated at more than one percent of its total capacity.[48] While substantial fluctuations have occurred from one month to another, the average number of daily exits of Palestinians through Erez between 2007 and 2017 was just 190.[49]

With such a wide margin of manoeuvre between capacity and actual throughput, the Israeli authorities are able to make full use of Erez's cutting-edge security technology. The terminal is equipped with a state-of-the-art 'millimetre wave' body scanner, developed by the California-based firm L-3 Communications Inc., which appears to be 'so sensitive that it creates a complete holographic image of the traveller and allows the screener to see even a tissue or penny stuck in a pocket'.[50] The very high resolution of this screening technology is what enables Israel to actually enforce the far-reaching restrictions intermittently imposed on Palestinians crossing through Erez who, as part of a new directive announced by COGAT in August 2017, are not permitted to carry a USB drive as they exit Gaza.[51] Before reaching the scanner though, any candidate to exiting Gaza must walk through a nine hundred metre long, four metre wide caged passageway spanning the entire no-go zone imposed by Israel around Erez. In dazzling contrast with the width of the complex, this narrow and elongated excrescence is the clearest architectural manifestation of the revision of the terminal's programme: from maximising the secure flow of people, to securing their minimal flow.

As the respective cases of Kerem Shalom and Erez illustrate, the routing of all circulations through a single terminal and the concentration of all transit procedures within the same architectural complex gives extraordinary leverage to the agency operating it. Due to its spatial and functional compactness, the terminal works as a key multiplier of logistical power – both in terms of its scalar reach and its distributed intensity. The tiniest tweak to the protocols of circulation across the terminal – of a few centimetres here, a few pixels there – immediately has exponential repercussions throughout the circuits that it connects. The architecture of logistics tends towards the terminal as both its formal paradigm and its political ideal: the optimal point of centralised control over the exchange between two or more circuits.

Conclusion

Over the time of the writing of this essay, in Gaza, 3,778 unarmed protesters were shot with live

ammunition, and 131 were killed.[52] They were shot by Israeli army snipers posted on the other side of the Gaza fence, as they dared to venture into the unilaterally imposed buffer zone that runs all along it. Unsurprisingly, it is along this fence – more precisely, along this heavily militarised, thick border apparatus – that protesters have decided to gather every Friday since 30 March 2018: this fence which indefinitely imprisons a population of two million people, negating their mobility, entrapping them into a passive condition of receivers of insufficient aid, and denying their most basic rights. By directing their ongoing demonstrations against the fence, protesters are challenging the material infrastructure of the regime of power imposed over Gaza. For that reason, they are being shot down.

Throughout this essay, the enduring blockade of the Gaza Strip was proposed as an extreme manifestation of what could be called the rule of logistics. Gaza under blockade points to the way in which logistics ceases to be a mere instrument to the deployment of a machine of power – be it war or capital – and instead constitutes a mode of power in its own right, with its intrinsic rationality and its specific mode of operation, at times even mobilising a war machine to secure its functioning. The domain of operation of this specifically *logistical* mode of power can be defined as the channelling, regulation, and modulation of all forms of circulation across delimited territories. The case of Gaza also shows that the exercise of logistical power doesn't only result in the accelerated capitalist mobilities that it is primarily known and critiqued for; rather, it can also be leveraged to produce conditions of confinement, isolation, and restriction of mobility. Through an examination of the logic of territorial delimitation that is central to the operations of logistics, it was argued that the zone and the camp were both spatial products of the same logistical rationality. Zooming into the border architecture of such logistical enclosures, the figure of the terminal was retained as the major architectural manifestation of logistical power, in as much as it forms the most compact spatial solution to the demand of centralised control over distributed circulations. The links that were traced between the architecture of the Gaza blockade and that of more common logistical sites enabled us to posit that logistics, as a single spatial and technical apparatus, has in fact two modes of functioning with regard to the circulations that it governs: release and constraint. The defining character of logistical power may be located in this ambivalence, in its capacity to do both, alternately as well as simultaneously, and above all, differentially. At its core, what this essay attempted to outline is a notion of logistical power as a mode of power exerted through the production of a differential regime of mobility.

Developing an understanding of logistics as a differential technology may enable us to connect, both conceptually and practically, the forms of resistance to an overpowering circulation of capital with the many concurrent struggles over the denial of mobility.

Notes

1. Jasper Bernes, 'Logistics, Counterlogistics and the Communist Prospect', *Endnotes* 3 (September 2013), https://endnotes.org.uk.
2. A non-exhaustive list of the literature would include: Anna Tsing, 'Supply Chains and the Human Condition', *Rethinking Marxism* 21, no. 2 (April 1, 2009): 148–76, https://doi.org/10.1080/08935690902743088; Alberto Toscano, 'Logistics and Opposition', *Mute*, 9 August 2011, http://www.metamute.org; Bernes, 'Logistics, Counterlogistics and the Communist Prospect'; Alberto Toscano, 'Lineaments of the Logistical State', *Viewpoint Magazine*, 28 September 28 2014, https://viewpointmag.com; Charmaine Chua, 'Logistics, Capitalist Circulation, Chokepoints', *The Disorder Of Things* (blog), 9 September 2014, https://thedisorderofthings.com; Brett Neilson, 'Five Theses on Understanding Logistics as Power', *Distinktion: Journal*

of Social Theory 13, no. 3 (December 2012): 322–39, https://doi.org/10.1080/1600910X.2012.728533; Ned Rossiter, *Software, Infrastructure, Labor: A Media Theory of Logistical Nightmares*, (New York: Routledge, 2016); Martin Danyluk, 'Capital's Logistical Fix: Accumulation, Globalization, and the Survival of Capitalism', *Environment and Planning D: Society and Space*, 9 April 2017, https://doi.org/10.1177/0263775817703663; Transnational Social Strike Platform, *Logistics and the transnational social strike* (Autumn 2017), journal, https://transnational-strike.info.

3. The formula is borrowed from Alberto Toscano, although his own discourse is critical of such simplified framing. See Toscano, 'Lineaments of the Logistical State'.
4. The most explicit formulation of this conceptual schema can perhaps be found in an article by Charmaine Chua, which opens with a report on the 'Block the Boat for Gaza' initiative that saw activists in the port of Oakland blocking an Israeli ship for several days, in solidarity with Palestine. 'The disorder of things is in the blockade', the article concludes, seemingly blind to the paradox raised by such claim. See Chua, 'Logistics, Capitalist Circulation, Chokepoints'.
5. Deborah Cowen, 'Containing Insecurity: Logistics Space, U.S. Port Cities, and the "War on Terror"', in *Disrupted Cities: When Infrastructure Fails,* ed. Stephen Graham (Routledge, 2010), 83.
6. Darryl Li, 'The Gaza Strip as Laboratory: Notes in the Wake of Disengagement', *Journal of Palestine Studies* 35, no. 2 (2006): 38–55.
7. UN General Assembly, Michael Lynk, 'Report of the Special Rapporteur on the Situation of Human Rights in the Palestinian Territories Occupied since 1967' (23 October 2017), 17, http://undocs.org.
8. COGAT, Twitter feed. https://twitter.com.
9. See, among many other reports, those issued by the UN Commissions. Report of the Independent Commission of Inquiry on the 2014 Gaza Conflict, A/HRC/29/52 (24 June 2015); Report of the UN Fact-Finding Mission on the Gaza Conflict, A/HRC/12/48 (25 September 2009).
10. State of Israel, '2014 Gaza Conflict: Factual and Legal Aspects' (May 2015), http://mfa.gov.il.
11. UN Office for the Coordination of Humanitarian Affairs – Occupied Palestinian Territory, 'Gaza Strip Access and Movement – August 2016' (16 August 2016), https://ochaopt.org.
12. 'Israel Routinely Attacks Palestinian Civilians in the Buffer Zone', Al-Haq (website), 24 March 2016, http://alhaq.org.
13. Palestinian Centre for Human Rights, 'Israeli Attacks against Palestinian Fishermen in the Gaza Strip (1 January – 31 October 2016)', PCHR website, 16 December 2016, https://pchrgaza.org.
14. Daniel Estrin, 'Israel Speeds Up Underground Border Wall To Block Gaza Tunnels', npr.org, 24 January 2018, https://npr.org.
15. Christian Heinen, *Geschichte der Logistik*. Master Thesis: 2004. p. 3.
16. Amira Hass, 'Hummus Starts Trickling Past Israel's Blockade on Gaza', *Ha'aretz*, 9 September 2011, https://haaretz.com, Available at: http://gisha.org.
17. Amira Hass, '2,279 Calories per Person: How Israel Made Sure Gaza Didn't Starve', *Ha'aretz*, 17 October 2012, https://haaretz.com.
18. Francesco Sebregondi, 'The Smart City of Gaza', *Volume* 49 (2016): 81–84.
19. Ariella Azoulay and Adi Ophir, 'Abandoning Gaza' in *Agamben and Colonialism,* ed. Marcelo Svirsky and Simone Bignall (Edinburgh: Edinburgh University Press, 2012), 178.
20. Jean-Pierre Filiu, *Gaza: A History* (London: C. Hurst & Co., 2014).
21. Keller Easterling, *Extrastatecraft: The Power of Infrastructure Space* (London; New York: Verso, 2014), 25–69.
22. Ibid., 58.
23. Ibid., 67.
24. Manuel Castells, *The Informational City: Information Technology, Economic Restructuring, and the Urban-Regional Process* (Oxford: Blackwell, 1989).
25. The quote is from Paul Virilio, who was among the first to write about the logistical dimension of camps. It is worth quoting the whole passage here: 'The

precious lesson of the camps and the gulags has not been heeded, because it was erroneously presented not only as an ideological phenomenon, but also as a static one, an enclosure. Its absolute "inhumanity" was but the ostensible reintroduction in history of the original social bestiary, of the immense mass of domestic bodies, bodies unknown and unknowable. What else has the proletariat been since antiquity, if not an entirely domesticated category of bodies, a prolific, engine-towing class, the phantom presence in the historical narrative of a floating population linked to the satisfaction of logistical demands?' Paul Virilio, *Speed and Politics*, trans. Mark Polizzotti (Los Angeles: Semiotext(e), 2006), 98.

26. UN OCHA OPT, 'Monthly Humanitarian Bulletin', May 2018, https://ochaopt.org.
27. Giorgio Agamben, *State of Exception* (Chicago: University of Chicago Press, 2005).
28. Giorgio Agamben, *Homo Sacer: Sovereign Power and Bare Life*, trans. Daniel Heller-Roazen (Stanford: Stanford University Press, 1998).
29. Michel Foucault, *The History of Sexuality, Vol.1: An Introduction*, trans. R. Hurley, new edition (London: Penguin, 1990), 82.
30. Didier Fassin and Mariella Pandolfi, *Contemporary States of Emergency* (New York ; Cambridge, MA: Zone Books – MIT, 2010), 16.
31. Deborah Cowen, *The Deadly Life of Logistics: Mapping Violence in Global Trade* (Minneapolis: University Of Minnesota Press, 2014), 171.
32. 'Inside Dubai's labour camps', *The Guardian*, 8 October 2008. https://theguardian.com.
33. See Gyöngyi Kovács and Karen M. Spens, 'Humanitarian Logistics and Supply Chain Management: The Start of a New Journal', *Journal of Humanitarian Logistics and Supply Chain Management* 1, no. 1 (20 May 2011): 5–14, https://doi.org/10.1108/20426741111123041.
34. Benjamin H. Bratton, *The Stack: On Software and Sovereignty* (Cambridge, MA: MIT Press, 2016), 21.
35. See the examples mentioned by Deborah Cowen in her chapter titled 'Logistics Cities', in particular, Basra Logistics City in southern Iraq. Cowen, *Deadly Life of Logistics.*
36. 'Our Mission', Global Palestine Connected Gaza website, http://connectedgaza.com [accessed, 9 April 2018].
37. United Nations Country Team in the Occupied Palestinian Territory, 'Gaza in 2020: A liveable place?', (August 2012), https://unrwa.org.
38. See endorsement letter (21 July 2016) available for consultation on the Connected Gaza website, https://dvqlxo2m2q99q.cloudfront.net.
39. Markus Hesse, *The City as a Terminal: The Urban Context of Logistics and Freight Transport* (London: Routledge, 2008).
40. Castells, *The Informational City*.
41. 'Gaza food situation tight as Karni crossing closed', *IRIN News,* 7 March 2011, https://irinnews.org.
42. Gisha, 'Graphing 10 Years of Closure', gisha.org, September 2017, http://gisha.org.
43. Gisha, 'Graphing 10 Years'.
44. Netherlands Representative Office in Ramallah, Facebook post, 1 June 2016, https://facebook.com.
45. Gisha, 'An Inch at a Time', gisha.org, 11 February 2016, http://gisha.org.
46. Kushal Nahata, 'Trends that will revolutionize logistics in 2018', *Material Handling and Logistics News*, 26 December 2017, http://mhlnews.com.
47. Gisha, 'The Erez Crossing', http://gisha.org [accessed, 13 June 2018].
48. Jodi Rudoren, 'Between Gaza and Israel, a Border Crossing in Need of Travelers', *The New York Times*, 4 September 2014, https://nytimes.com.
49. Gisha, 'Graphing 10 Years'.
50. Dion Nissenbaum, 'High-tech border crossing serves as monument to Mideast gridlock', *McClatchy News*, 25 May 2007, http://mcclatchydc.com.
51. Orly Noy, 'IDF bans laptops, food, toiletries for Palestinians leaving Gaza', *+972 Magazine*, 16 August 2016, https://972mag.com.
52. UN OCHA OPT, 'Humanitarian snapshot: casualties in the context of demonstrations and hostilities in Gaza, 30 March – 7 June 2018', 7 June 2018, https://ochaopt.org.

Biography

Francesco Sebregondi is an architect and researcher, whose work explores the intersections of violence, technology, and the urban condition. Since 2011 he has been a Research Fellow at Forensic Architecture, former Coordinator of the collective project (2013–2015), and co-editor of its main publication 'Forensis: The Architecture of Public Truth' (Sternberg Press, 2014). His investigative work on Gaza includes the 'White Phosphorus' report (2012, with Michael Sfard and Human Rights Watch), the 'Gaza Platform' project (2015, with Amnesty International), and the 'Conquer & Divide' platform (2018, with B'Tselem). Since 2015, he has been a CHASE-funded doctoral candidate at the Centre for Research Architecture, Goldsmiths University of London.

ICEBOX: The Logistics of Detention

Stephen Ramos

The United States operates the largest immigrant detention system in the world.[1] Detention is the practice of jailing immigrants while they await the determination of their immigrant status or potential deportation. Detainees are held in nearly two hundred detention centres across the country, which are locally administered by private firms or county governments, and coordinated through service processing centres. In FY2016, over 359,000 people were detained, at a national daily average of 34,000 in order to meet immigration detention quotas.[2] The two governmental agencies that orchestrate the system are the US Immigration and Customs Enforcement (ICE) and the US Customs and Border Protection (CBP), under the direction of the Department of Homeland Security (DHS). Created in 2003 in the aftermath of terrorist attacks on 11 September 2001, DHS merged twenty-two different departments and agencies into an integrated unit authorised to administer and enforce immigration law. DHS brought together investigative and enforcement elements of the state immigration apparatus, and proceeded to criminalise select communities within international migratory patterns. The merger established a new framework for intersectoral collaboration and consolidation, and as such, a growing integration of migration and logistics processes is manifest.

ICEBOX is a serial US architecture of Post-Westphalia, where state authority and non-state actors agree to handle and hold bodies for profit.[3] ICEBOX is a static, standard container with coded content, filled with people. ICEBOX territories are comprised of hub-spoke points and lines, which invert orthodox centre-periphery territorial organisation, in search of remote, poor areas as sites for detention centre hubs. ICEBOX scales move from cellular stasis in isolation, through local police station holding jails, to hemispheric, transborder transportation routes and modes. ICEBOX architecture is geographic. ICEBOX systems are administered in a juridical field that traverses these scales in parallel, and consolidates their complex, interrelated functionality. ICEBOX 'concretises space and time through its material realities'; its architecture and its administration are mutually constitutive.[4] ICEBOX space is designed for the double subjection of select immigrants to the discipline of detention and to the logistics of supply chain management, in the interests of both state and capital. ICEBOX systems are best understood as a logistics of detention.

At the intersection of logistics and migration, images of human trafficking proliferate in tragic endings of bodies recovered from shipping containers, and sea episodes of drowned migrants encountered on shipping routes, among many others. I focus on US for-profit immigrant detention centres as nodes within global capital flows. US ICE detention centres process humans through transnational, encoded power systems, which couple tightly to the logics, infrastructure, and public-private strategies that comprise the international logistics industry. I consider the immigrant detention system through the lens of international logistics as a way to

demonstrate how its scale and its architecture – its spatial contours and manifestations – mirror those systems of international supply chain coordination, assembly, transport, and sale.

It should be clear at the outset that my objective is not to trivialise immigrant detention by making these parallels to the logistics industry as merely an intellectual exercise. Rather, through engaged scholarship I wish to illustrate the systematic dehumanising spatial practices of immigrant detention from the perspective of contemporary research in 'transnational migration from below'.[5] These highly structured environments extend nation-state sovereignty claims of control from the territorial to individual detainee bodies. Cybernetics offers a helpful structure to think about transdisciplinary systems regulation and management, which are essential to the functioning of a logistics system.[6] Cybernetics is rooted in the Platonic consideration of governmental administration and its science, which are also essential to the politics of immigration detention.[7] Logistics' military and industrial origins help to illuminate how logistics function today. From there, it is only a slight move to demonstrate that immigration detention follows many of these military and industrial histories in contemporary forms, functions, and administration. Human detention is both symptomatic and emblematic of a new phase of international labour processing, nation-state governance, and the neoliberal spatial manifestations that run throughout this edition's theme.

I begin by reviewing the history of modern logistics comprised of conjoined military and commercial interests, which then serves as the background for the militarisation of the US southern border and the production of immigrant 'illegality' as an essential administrative mechanism. I explore the security/trade juxtaposition that seemed to pit a relatively new infatuation with borderless capital flows against heightened security regimes, and the post-9/11 institutional and corporate framework for immigrant detention.[8] I then look specifically at the 'bodies in beds' detention quota agreements ICE signs with private detention companies. After, I trace the production of spatial forms in the logistics of detention in the ICEBOX warehousing system. Finally, I visit Georgia, and its Atlanta capital, as a node and epicentre of the international logistics detention network.

Logistics, territory, and border behaviour

> Since World War II, logistics experts have conceptualised economy anew by spatialising cost-benefit analysis and applying systems analysis to distribution networks… Historically a military technology of war and colonialism abroad, today logistics lead rather than support the strategies of firms and security of nations across transnational space. These shifts have implications for the geopolitics of borders and security but also for social and political forms premised on the territory and ontology of national space. (Cowen, 2010)[9]

Manuel DeLanda traces the origins of modern logistics to the early nineteenth century, when French and US militaries develop the perfect interchangeability of component weaponry parts to standardise their transport and assembly over territories to sites of conflict.[10] The move transfers knowledge from 'the worker's body to the hardware of machines and the software of management practices'. From this, DeLanda derives his definition of 'logistic rationality', or the degradation of human skill in favour of capital control, out of which Taylorism is born.[11] Transportation technology, particularly the railroad, created the definitive spatial circumstances to separate production from consumption, and the necessary coordination of time, commodity movement, and value exchange were codified.[12] DeLanda's archaeology of the military and mercantile origins of logistics ('trade and raid'!)[13] are so entangled that he finds it difficult to determine a

causal linearity, and by the end of World War II, the military industrial collaboration is such that pure realms of either are no longer discretely discernible, and each becomes very interested in management science. The RAND Corporation, and other institutions, was able to determine 'critical path' efficiencies through game theory and computational modelling, which established a precedent for what DeLanda terms 'peacetime logistics'.[14] As Deborah Cowen clarifies in the citation above, since then, these strategies no longer simply support, but rather lead firm and security spatial decisions, continue to merge corporate and political interests, and reconfigure border statecraft scale and complexity. Cowen's work also explores military protection of international corporate supply chain routes, and the spatial diffusion of the figurative factory across supply-chain networks.[15] Stephen Graham's book on military urbanism further underscores new spatial configurations,[16] from the international to the metropolitan scale, produced by the militarisation of supply-chain logics and their associate zones of exception.[17] Clearly, then, the interpenetration of military tactics with urban and regional strategies, and the associate transnational supply-chain geographies that support them, continue to reproduce the collaborative, and mutually constitutive spatial systems.[18]

Along the US southern border, another expression of militarised logistics space is comprised of contemporary migratory patterns and the production of the 'illegality' of Mexican (and Central American) workers. As Liette Gilbert writes, 'the historical interplay between unlimited demands for Mexican labour and easy deportability (rendering Mexican labour distinctly disposable) in immigration law instituted the legal production of Mexican/migrant illegality'.[19] Similar to DeLanda's point on weapons development, migrant labour denigration and disposability, enshrined in a discourse of 'unskilled' labour, renders individuals in this labour force interchangeable. The spatialisation of legality, and its management, are cybernetic governance concerns, which can, through strategy, be instrumentalised toward broader geopolitical and geoeconomic objectives.[20] Here, the border is an active agent; a 'trickster figure',[21] whose Janus-faced behaviour performs the contradictory impulses of continental, neoliberal forces, which are often not in synch.[22] But if not always coordinated, the production of illegality is capable of performing various functions within various frames. In Joseph Nevins's work, he proposes that the US acts as a 'gatekeeper state', and links the US-led neoliberal market restructuring of rural Mexico (and throughout Central America) to the influx of migrant workers to the US.[23] In this way, market forces both deterritorialise workers, simultaneously promise migrant work in the North as a palliative, and all-the-while police this itinerant workforce in the US with the threat of deportation based on the fabricated premise of 'illegality'.[24] As an administrative construct, illegality imposes 'legal nonexistence'[25] on the approximately twelve million people living in the US without legal immigration documents; people who are otherwise fully physically, socially and economically active in civil society, but lacking legal and political recognition.[26]

Recent Border Studies literature includes moves to theorise borders across sub- and inter-national containment, through the study of the ethnic, cultural, and regional transborder, transcultural, and transnational crossing research.[27] More directly related to immigrant detention is Liette Gilbert's research on 'rebordering'[28]: the jurisdictional collaboration and transfer of immigrant enforcement authority from national immigration security to state and local police powers.[29] These range from local laws prohibiting immigrant labour gathering in Hazleton, Pennsylvania,[30] to US ICE (a federal agency) agreements with certain local and police departments to collaborate on immigrant policing

detention.[31] [Fig. 1] As she writes,

> Immigration-related municipal ordinances, resolutions, and declarations are some of the latest neoliberal strategies deployed in the governance of immigration, the delocalisation of border control, and the re-bordering of state power…These municipal ordinances and declarations re-border […] the inclusion/exclusion of (unauthorised) migrants by expanding territorial and political rationality of immigration control to small towns.[32]

She further relates this to the decline of social rule in the face of waxing neoliberal control regimes,[33] and the merging of Foucauldian 'disciplinary societies' in particular sites (ICEBOX) with the Deleuzian 'control society', a matrix comprised of a more decentralised monitoring system.[34] This conceptual framework describes ICEBOX's hub-spoke spatial design. Deleuze and Guattari distinguish between their ever-deterritorialised 'nomad', and their 'migrant' who wishes to reterritorialise upon destination, with associate societal reception and/or rejection based on the perceived threat of each.[35] Migrant 'illegality' produces a condition of limbo, where the individual is denied a clear category, and thus, all the more vulnerable to societal and political manipulation and procedural whim. In my visits to the Stewart Detention Centre in South Georgia, I've spoken with a recently-arrived detained Honduran teenager fleeing from gang violence, and a Mexican man who has lived in the US for nearly twenty years, who runs a successful car business, and has children – US citizens – in secondary school. The spectrum of immigrant status is broad, not a binary, but the 'bodies in beds' quotas are not discerning. In her work on remittance landscapes, Sarah Lynn Lopez coins the condition as 'a new way of life – that is, *remitting is a way of life* – that manages separation, dispersion, fragmentation, and ambivalence on a daily basis'.[36] ICE agents collaborate with local police as veritable freight-forwarding agents, to organise the movement of immigrants through societal paths and into detention centres.

Freight, on the other hand, can increasingly move through logistics networks without friction by negotiation, dismantling, or reinterpreting obstacles of national borders, labour laws, and trade agreements.[37] In these instances, borders can shift situationally and contextually, and reorganise territories and sovereignty jurisdictions. Multiple territories converge and part dynamically as well, in the complex interplay of technology, culture, commerce, distribution, their respective and constitutive politics. As Clare Lyster suggests, these mercurial, 'short-lived articulation(s) of territories' merge and interplay at an ever-changing pace, producing continual re-articulations of site.[38] These tensions and fractures of radical environmental control and neglect comprise the larger contradictions embedded throughout the immigrant detention system.

Border – state / 'bodies in beds'

The immigration detention system is an industrialisation of humans, while, increasingly, the logistics sector grants primacy, constituent rights, and transnational freedoms to animal and material freight. Migrants move from country of origin to the US as itinerant labour for construction, agriculture and food processing, and personal services, and as bodies to meet detention-centre quotas.[39] Migrants form patterns where chain migration is transformed into supply chain. As Universal Product Codes turn objects into binary information, and logistics geolocate and track this information, immigrant detainees are given an Alien Registration Number (or 'A number') for the same purpose.[40] Human becomes object; object becomes datum; and, datum can be tracked geographically through the ICE Detainee Locator System.[41] Contemporary international commodity flows move 'people, goods and information' through parallel, sometimes

indistinguishable channels, and ICEBOX is a data farm.[42] Increasingly, however, a key difference is that immigrants are misplaced or lost in the detention system, making it difficult for family members and immigration lawyers to follow detainee location, while product supply-chain management is far more precise with inanimate cargo.[43]

The apparent policy contradiction – Hollifield's 'liberal paradox' – of neoliberal trade aperture and the diminishing of nation-state powers, with an intensified, nationalistic border militarisation, underscores the tensions in state geopolitical and geoeconomic objectives.[44] Mathew Coleman's research on US border statecraft suggests that rather than performing through coherent policy,[45] the larger continental neoliberal project is expressed in 'collisions of mutually-opposed tactics',[46] which are not easily streamlined. The security-trade consolidation was the foundational mandate for DHS, in the hopes that a governing oversight body could optimise efficiencies in each system; areas previously relegated to the Departments of Treasury and Justice. Within the heightened post-9/11 'paradox', the immigrant detention system allows the state to simultaneously perform tough 'law and order' tactics, remaining mindful of domestic labour cycle needs. The choice is no longer Solomonic in terms of value creation, because immigrant bodies create wealth by simply filling the detention centre bed quotas, guaranteed by law, that ICE pays private companies to administer. ICEBOX performs Michel Foucault's list of discipline techniques: 'In the first instance, discipline proceeds from the distribution of individuals in space', and time is capitalised upon and through bodies in this organization.[47]

Michael Flynn's work on the complex relationship between state authority and non-state actors helps to synthesise essential findings in the immigration detention literature.[48] He first refers to Hernández-León's term 'the migration industry' as that broad spectrum of actors, motivated by profit, that enables human trade across international borders.[49] He then refers to Nyberg Sørensen and Gammeltoft-Hansen's addition of 'control providers' (such as private detention centre companies) and the 'rescue industry' (NGO human rights advocacy groups) to the migration industry concept.[50] Although not officially members of the state, this array of actors is authorised through state agreements. Flynn clarifies that the performance of state objectives, counter to much of the 'camp' literature on spaces of exception,[51] must be understood rather in terms of a specific objective, legislatively designed and enacted, of 'depriving noncitizens of their liberty for reasons related to their immigration status'.[52] This grouping of state authority, non-state actors, and cooperation agreements administers the migration industry and designs ICEBOX territories and architectures. Jesse LeCavalier uses the term 'logistification' to connote 'the inclusive process that includes the entire life of a product and works to flatten, smooth, and lubricate as it organises material in both space and time.'[53] The detention system is the logistification of an integrated, policed international system of human movement.

The business of immigrant detention is booming. Of the average thirty-four thousand daily immigrant detainees, there has been a steady increase in those held in corporate-run detention centres, from 49 percent in 2009, to 62 percent in 2015, to 71 percent, as of November 2017.[54] The two major for-profit companies that operate these detention facilities are CoreCivic (formerly the Corrections Corporation of America, or CCA) and the Geo Group. Each is also involved in the design and management of for-profit prisons for the older, larger US incarceration system, which is also the largest of its kind in the world. The detention centres were originally designed as prisons, and the criminalisation of immigration provides a 'growth opportunity' for these firms. In 2009, there

had been a multi-year decline in the undocumented immigrant population. After aggressive private detention lobbying, intensified out of concern for the future of their business, Senator Robert Byrd of West Virginia was swayed, and put language into the DHS 2010 Appropriations Act to maintain funding levels for the detention companies for 'not less than 33,400 beds', which was then increased to 34,000 beds in 2013. This became known as the 'immigrant detention quota', or the 'bed mandate'.[55] The total budget for immigration detention in 2016 was $6.1 billion, and ICE requested $6.23 billion for 2017. This is paid for by US taxpayers, which includes a large portion of undocumented workers in the country who paid $11.2 billion in taxes under forged social security numbers.[56] These companies – non-state actors – sign US Marshal Service Intergovernmental Agreements with the US Congress and ICE, in concert with state and local police agents, to provide a guaranteed quota of detainees to fill detention facilities' occupancy. The average daily cost per bed is $127, which means that a significant portion of that ICE budget goes directly to CoreCivic and the Geo Group.[57]

The 'bodies in beds' quotas comprise an industry who's profit motive has little to do with any actual legal 'due process', but rather encourages any form of detention to occupy the warehousing spaces for the bodies, which can then be charged to the US taxpayer.[58] Detainees perform most of the labour required for centre maintenance, including cooking, cleaning, laundry, haircutting, for $1/day or less, although this is legally unconstitutional.[59] In preparation for a recent class action case in California for detained immigrants, the American Civil Liberties Union (ACLU) determined that the 207 detainees who eventually *won* their cases and were able to remain in the US, cost taxpayers $10,370,493 for what was later ruled as their unnecessary detention.[60] In 1988, CCA founder Thomas Beasley described the commodity of immigrant detention business in the classic, abstracted widget rhetoric: 'You just sell it like you were selling cars, or real estate, or hamburgers'.[61] Here then, just as the migrant labour is devalued and made both interchangeable and disposable, the bodies that house this labour are also abstracted to an interchangeable product for processing, tracking, and warehousing.

ICEBOX

The titular 'ICEBOX' phrase has various origins. The 'box' suffix is added to ICE and simply plays on the agency's initials. This echoes, of course, a shorthand term for cargo containers.[62] It also signifies the climate of the detention centres, which are notoriously cold, as for-profit companies seek to cut detention costs and not pay for humane facility climates. The Spanish term for ICEBOX is '*hieleras'*, which traditional refers to the refrigerator connotation, but also serves as the common signifier for the detention facilities among Mexican and Central American communities.[63]

The ICEBOX typology is familiar. Often hidden behind vegetation or recessed from road entrances, detention centres are clad in institutional, monotone facades, with a series of corporate and national flags at the entrance, and organised in a modular composition. The architecture, as illustrated in accompanying photos, is quite similar to the warehouse/processing facility typologies seen internationally. [Fig. 2] ICE finances detention centre architecture, but its design, construction, and operation are left to the private companies. ICE's 'performance-based national detention standards' were modelled on standards for civil incarceration,[64] which were originally written by CCA for the detention lobby, American Corrections' Association, as the industry 'Standards of Accreditation'.[65] ICE and the companies consistently reject requests for architectural plans, in defiance of US Freedom of Information laws.[66] ICEBOX is a black box, and its exact spatial contours are a mystery. Distant sites are stripped, vegetation is removed, surrounded with double-gated barbed-wire fences, and cellblocks

are connected with linear corridors, periodically interrupted with locking jail doors. The environment is furnished in cold, cheap metal, and the insidious fluorescent light tubes run on day and night, making it difficult for detainees to sleep.

Sarah Lynn Lopez describes detention centre architecture as 'rural warehouse-prison vernacular', which precisely and succinctly describes its rudimentary formal and programmatic fusion.[67] The security-trade hybridity of detention centre design embodies the fused functions of ICE in the post-9/11 border regime. Nevertheless, ICEBOX is more the latter than the former. While detainees are indeed 'warehoused', unlike warehouses, there are only two entrances to the facility: one for staff, visitors, and ICE agents, and the other for detainees arriving for delivery. Warehouse open access accentuates its need for product turnover and processing, while ICEBOX offers no pretence or clarity – in law or design – of turnover (release). There is a barren outdoor space to satisfy the legal sunlight access requirement for detainees, television, limited libraries, visitation rooms separated by glass, and a kitchen. Detainees move through their days in waiting, and cases of mental health suffering and suicide have been amply documented.[68] ICEBOX began as a prison, and it closely adheres in form and programme to this origin.

Similar to warehouses, however, detention centres process and separate detainees by gender and age, with some facilities designated as mixed for men, women, and children, and others designated as only for men or women and children.[69] From there, they are processed by security-level distinctions. Detainees wear colour-coded prison uniforms representing their criminal histories. Level 1 detainees, with no criminal record, wear blue uniforms, Level 2 orange, and Level 3, the highest-security detainees, wear red.[70] To clarify, all criminal detention is served in other prison facilities, such that detainees in detention centres are simply awaiting immigrant status or deportation decisions. Detainees are then grouped by these criteria, with lowest-security blue housed in a single, large room with approximately sixty beds, to smaller rooms with two beds, to isolation rooms for heightened security detainees, and as punitive measure for any perceived misbehaviour by any detainee. [Fig. 3a, 3b] Yet codes can be transgressed out of whim or need, and detainees can be assigned to isolation beds if the appropriate bedroom type is already full.[71] Spatial capacity-logistical concerns trump detainee well-being concerns. The sorting, then, is not unsimilar to the kinds of processing by product brand and type that occurs in logistics distribution centres.

There are now cases where hotel chains rent rooms to ICE for ancillary detention use,[72] and with an increase in immigrant policing, this may continue into a kaleidoscope of spatial forms and architectures as nodes in the detention network.[73] Similar to drayage yards that sell off-site storage for container and freight transhipment at nearby sites for cheaper than port storage, one can imagine this kind of private competition for holding centres as future pretenders to the ICE budget.

The private detention companies further subcontract food and health care services to other subsidiaries, and human rights organisations have registered multiple complaints about rancid food quality and poor medical care, due to profit-margin motivation limiting sufficient investment for these services.[74] While several civil rights groups have conducted extensive detainee interviews and filed complaints about ICEBOX conditions, ICE inspections of the facilities are infrequent and none have ever failed inspection. The outsourcing of the detention centres, with secondary outsourcing to health, food, and transportation services sets a precedent for the extended privatization and commercialization of the network and its infrastructure.

Fig. 1

Fig. 2

Fig. 1: ICE agents collaborate with local police in metro Atlanta to detain an immigrant at his work place. Photo: Mundo Hispánico Atlanta. Used with permission.

Fig. 2: Modular detention centre forms. Photo: Periódico La Visión Atlanta. Used with permission.

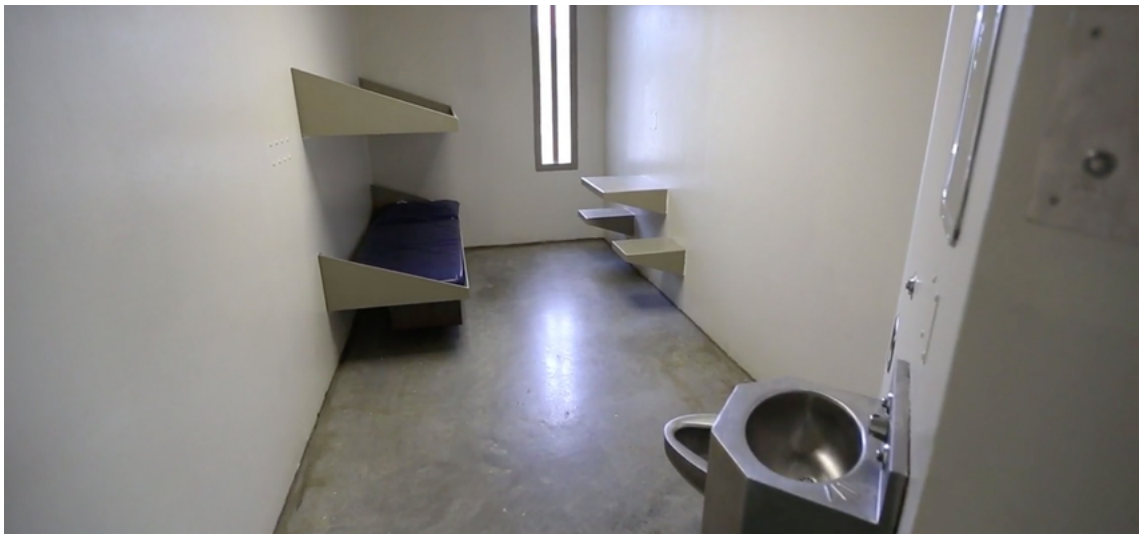

Fig. 3a

Fig. 3b

Fig. 3a, 3b: ICEBOX types. Two-bed cell and sixty-bed cell. Photo: Periódico La Visión Atlanta. Used with permission.

The detention facilities are essentially unincorporated and extra-territorial, similar to free-trade zones of exception for cargo processing.[75] Detention centres are predominantly located in poor, remote areas where low-cost land is easily acquired, and detention centre companies can often negotiate tax incentives in these poor areas based on the promise of job generation. These are also common strategies for logistics warehousing for inland ports and transhipment centres.[76] The remote locations complicate detainee access to legal services, because even pro-bono services are rarely willing to travel such distances to defend cases that have a high probability for deportation, regardless of the individual circumstances.[77] Detention centre programmes can include rudimentary court facilities where cases are adjudicated, and this further complicates detainees' access to lawyers in distant cities. With an increase in metropolitan and county police forces collaborating with ICE in immigrant detention, there are holding and processing centres located nearer to cities, but these generally function in a 'hub-spoke' hierarchy, with the principal detention hub located at the periphery.

In the 1990s, to addresses these distances between detention facilities, CCA acquired Transcor America, LLC, a bus company for detention and prison transportation services to all levels of US government.[78] The buses are able to transport spaces of detention across territories, as they themselves provide the same norms of spatial exception and legal suspension of the facilities. It is also a way of further coding detainee bodies with these laws and norms, as their environments change through mode and distance. The bus service is transnational, providing ICE the deportation service (when possible) for detainees by land, and dropping them off on the Mexican side of the border and ending what is often one cycle in a series of immigration, work, arrest, detention, and deportation processes. Transcor buses also take deportees to planes, which then go to more distant foreign countries once there is a critical capacity of a particular national group to make the trip worthwhile. Here again, transportation costs and logistics are the determining factors of detainee return, more than detainee resettlement concerns. If the railroad codified the nineteenth-century separation of production and market, the Transcor bus fleet operates with DeLanda's 'logistical rationality', separating and transhipping detainees across jurisdictions and territories. Detention in motion, in standardised, monitored environments, Transcor transforms the transportation system into hybrid security/commercial corridors that demarcate merging territories by connecting the 'hub spoke' organisation of the detention centre hierarchies. The return marks the completion of the migrant industry product cycle across borders, through policed routes that systematically open and shut.

A study of logistics is inevitably one of international, nested scales, and the state of Georgia in the US serves as an illustrative example of immigrant detention and logistics within a sub-state jurisdiction. Atlanta, the state's capital and primary metropolis, is an urban epicentre of the international neoliberal security apparatus. A recent *New York Times* article observes,

> few places in the United States have simultaneously beckoned undocumented immigrants and penalised them for coming like metropolitan Atlanta, a boomtown of construction and service jobs where conservative politics and new national policies have turned every waking day into a gamble.[79]

To heighten the mutual constitution of the two systems, Atlanta is among the finalists for Amazon's HQ2 project, and the company has already begun construction of an 78,968 square-metre shipping facility in its metro area. This construction will largely rely on workers from the same immigrant communities that are vulnerable to ICE immigrant detention. Before the 1980s, Atlanta's demographic

was characterised largely by African-American and white populations, as was most of the US South. Sun-Belt opportunities attracted immigrants from Latin America and Asia,[80] which has in turn helped boost the region's economic competitiveness in transportation, construction, hospitality, and poultry processing.[81]

There are many encounters, intersections, and interfaces between the state logistics and immigrant detention sectors. The poultry industry is one of the state's largest exports, shipping chicken parts principally to China. The Savannah port is internationally recognised for its innovation and patent-generation in refrigeration containerisation to help boost poultry exports. Here, there is another parallel to the titular ICEBOX proposition. A large percentage of the workers in the state poultry industry are migrants from Mexico, Central America, and the Caribbean, many of whom do not have legal immigration papers. As the industry's needs cyclically ebb and flow, the coordination of ICE raids on known immigrant communities essentially follows low periods of poultry production, and transfers bodies from one agro-logistics sector to its counterpart in the immigrant detention sector. Poultry companies contract employment recruiters in Mexico and other Central American countries, so the processes are vertically integrated, intersectoral, and transnational, again, echoing LeCavalier's term 'logistification' for ICEBOX throughout the entire 'product' life cycle.

Georgia is home to three private detention facilities, including the Stewart Detention Centre, which is the second largest in the country. The state also serves as the southeast regional hub for logistics, as it is heavily invested in the logistics and transportation sector. The Savannah port has the third highest container throughput in the country, and its harbour channel, located on the Savannah River, will be deepened by 1.5m for nearly 60km downriver and out to the Atlantic Ocean.[82] The $1 billion project makes clear that the state will not tolerate ecological 'friction' to interrupt its trade objectives. The hinterland impacts will extend last-mile warehousing and logistics facilities from their previous port radius of 20km inland, to nearly 60km-radius distance inland, expanding further westward into the state. In terms of spatial needs, the state industrial real estate market is booming, with a total inventory of 4,686,387m^2, 50,443,850m^2 under construction, and one of the lowest vacancy rates among the country's port regions.[83] Atlanta's Hartsfield-Jackson Airport is the world's busiest passenger airport, while also providing essential international airfreight services.

The clusters of logistics infrastructure with road and rail connectivity make use of Georgia's diffuse urbanisation patterns, and converts low-cost, fallow agricultural land into an extensive matrix of large-scale warehouse and distribution centres, as is the case for detention centres. Georgia's logistics sector moves $900 billion in cargo each year, and the state prioritises this sector for future economic growth. With the newest detention centre having recently opened in 2017, it is clear that Georgia state politics view the political climate and economic potential of logistics and detention centre growth as parallel strategies that can take advantage of circulatory connectivity, cheap land in peripheral areas, and extensive poverty, giving more leverage to private companies when offering to construct detention facilities in low-income, high-unemployment rural counties. Georgia courts and supports these sectors.

Conclusion

The parallels between the processes, architectures, territories, and spatial expression of logistics and US immigration detention are shockingly similar; more so when human bodies are periodically treated with less precision and respect than the inanimate freight that moves through trade flows. US immigrant detention is comprised of radical environments of human control and neglect, rife

with potential fractures and fissures. In her work on undocumented immigrant workers in Atlanta, Mary E. Odem uses the term 'subaltern immigrants', providing an essential insight into the agency and savvy of those communities in negotiating the contemporary complexities of immigrant policing.[84] Odem cites Partha Chaterjee's work on the distinction between 'political society' and 'civil society', noting that the former 'is a site of negotiation and contestation opened by the activities of governmental agencies aimed at population groups'.[85] The state's shape-shifting in immigrant policing practices to negotiate contradictory geopolitical and geoeconomic mandates also provides a measure through which undocumented communities are quite aware that the US is economically dependent on their labour. The current US administration is intensifying immigrant persecution, and one hopes that this too will generate new forms of contestation and adaptive response from unauthorised communities.

ICEBOX architecture is austere. It speaks a minimalism inspired by profit maximization for corporate shareholders. CoreCivic proclaims that it was born out of a need to bring competition to a prison industry rife with government waste and neglect, which is of course the core mantra for business privatisation.[86] Cost-saving efficiencies move detainees into ICEBOX systems, and a lax governmental regulatory feedback mechanism is uninterested in enforcing even minimal environmental or safety codes. Detainees are neither citizens nor voters. From many different countries of origin, they are profoundly cosmopolitan in circumstance, but they are not a constituency of basic rights. ICEBOX is insistently 'service-driven', with no clarity or ponderance of who is being served.

Jacqueline Stevens introduces her edited volume *Citizenship in Question* by describing the ever-growing, international migratory condition of 'disparity between the rituals of administration and the facts of habituation', and using the term 'ascriptive' – arbitrary placement – as descriptor for birthplace and citizenship status.[87] The volume begins with a narrative of the mistaken detention of US citizen Johann 'Ace' Francis in the metro Atlanta area, and his subsequent detention, deportation, and eventual repatriation, after ten years, where he then worked at the Atlanta Hartsfield Jackson Airport. The book goes on to document legislated human illegality and detention all over the world, from the US to Canada to the European Union, the Ivory Coast to New Guinea, Taiwan to China – everywhere.[88] It begins with an individual story to recognise each unique experience in this byzantine labyrinth, and scales up from there.

The migratory condition of perennial detention and/or deportation threat renders an itinerant labour force all the more vulnerable to the needs and caprices of capital and state demands. ICEBOX processes this condition and further extracts value through 'bodies in beds' contracts and quotas. The recent ascension of nativist political ideology and discourse to the highest levels of government has helped to boost detention company stock shareholder value, which in turn secures political campaign donations and support from these companies. The politics is performed differently, perhaps more egregiously, across parties and national contexts, but ICEBOX thrives across successive administrations.

Dissolve ICEBOX.

Notes

1. Global Detention Project. https://globaldetentionproject.org, accessed 22 March 2018.
2. Detention Watch Network. https://detentionwatchnetwork.org, accessed 22 March 2018.
3. Michael Flynn, 'Kidnapped, Trafficked, Detained? The Implications of Non-state Actor Involvement in Immigrant Detention', *Journal on Migration and Human Security* 5, no. 3 (2017): 593–613; Christian Kreuder-Sonnen, Bernhard Zangl, 'Which

Post-Westphalia? International Organizations Between Constitutionalism and Authoritarianism', *European Journal of International Relations* 21, no. 3 (2015): 568–594.

4. Jesse LeCavalier, *The Rule of Logistics: Walmart and the Architecture of Fulfilment* (Minneapolis; London: University of Minnesota, 2016), 36.
5. Sarah Lynn Lopez, *The Remittance Landscape: Spaces of Migration in Rural Mexico and Urban U.S.A.* (Chicago; London: University of Chicago Press, 2015), 12, 269; Katharyne Mitchell, *Crossing the Neoliberal Line: Pacific Rim Migration and the Metropolis* (Philadelphia: Temple University Press, 2004); Luis Eduardo Guarnizo and Michael Peter Smith, eds., *Transnationalism from Below: Comparative Urban Research* (Bloomington: Indiana University Press, 2013).
6. Norbert Wiener, *Cybernetics, or Control and Communication in the Animal and the Machine* (Cambridge, MA: MIT Press, 1948); *The Human Use of Human Beings: Cybernetics and Society* (Boston: Houghton Mifflin, 1954). See critiques in Paul N. Edwards, *The Closed World: Computers and the Politics of Discourse in Cold War America* (Cambridge, MA: MIT Press, 1996); 'Infrastructure and Modernity: Force, Time, and Social Organization in the History of Sociotechnical Systems', in *Modernity and Technology,* ed. Thomas J. Misa, Philip Brey, and Andrew Feenberg (Cambridge, MA: MIT Press, 2003).
7. Michael Griffin, trans., *Olympiodorus: Life of Plato and On Plato First Alcibiades 1–9* (London: Bloomsbury, 2015).
8. Manuel Castells, *The Rise of the Network Society, The Information Age: Economy, Society and Culture Vol. I* (Oxford: Wiley Blackwell, 1996).
9. Deborah Cowen, 'A Geography of Logistics: Market Authority and the Security of Supply Chains', *Annals of the Association of American Geographer* 100, no. 3 (2010): 600–620, 600.
10. Manuel DeLanda, *War in the Age of Intelligent Machines* (New York: Swerve Editions, 1991), 106.
11. Ibid.
12. Clare Lyster, 'Landscapes of Exchange: Re-articulating Site', in *The Landscape Urbanism Reader*, ed. Charles Waldheim (New York: Princeton Architecture Press, 2006), 221; Armand Mattelart, *L'Invention de la Communication* (Paris: Éditions La Découverte,1994); Wolfgang Schivelbusch, *The Railway Journey: The Industrialization of Time and Space in the Nineteenth Century* (Berkeley: University of California Press, 1986).
13. DeLanda, *Intelligent Machines*, 109.
14. DeLanda, *Intelligent Machines*, 112; Deborah Cowen, *The Deadly Life of Logistics: Mapping Violence in Global Trade* (Minneapolis: University of Minnesota Press, 2014); Paul N. Edwards, *The Closed World: Computers and the Politics of Discourse in Cold War America* (Cambridge, MA: MIT Press, 1996).
15. Cowen, *Deadly Life.*
16. Stephen Graham, *Cities Under Siege: The New Military Urbanism* (London: Verso, 2010).
17. Keller Easterling, 'Zone: The Spatial Softwares of Extrastatecraft', *Places Journal* (June 2012), https:// https://doi.org/10.22269/120610; *Enduring Innocence: Global Architecture and Its Political Masquerades* (Cambridge, MA: MIT Press, 2005).
18. Joshua Barkan refers to the corporate and state mirroring of one another as 'Double Bodies', in *Corporate Sovereignty: Law and Government Under Capitalism* (Minneapolis: University of Minnesota Press, 2013), 5–7.
19. Liette Gilbert, 'Immigration as Local Politics: Re-Bordering Immigration and Multiculturalism through Deterrence and Incapacitation', *International Journal of Urban and Regional Research* 33, no. 1 (March 2009): 29; Nicholas De Genova, 'The Legal Production of Mexican/Migrant "Illegality"', *Latino Studies* 2 (2004): 160–185; Mae M. Ngai, *Impossible Subjects: Illegal Aliens and the Making of Modern America* (Princeton: Princeton University Press, 2004).
20. Susan B. Coutin, 'Contesting Criminality: Illegal Immigration and the Spatialization of Legality', *Theoretical Criminology* 9, no. 10 (2005): 5–33.
21. Patricia L. Price, 'Postcards from Aztlán', in *Rituals of Mediation: International Politics and Social Meaning,*

ed. Francois Debrix and Cynthia Weber (Minneapolis: University of Minnesota Press, 2003), 49–65; Mathew Coleman, 'U.S. Statecraft and the U.S.-Mexico Border as Security/Economy Nexus', *Political Geography* 25 (2005): 185–209.

22. Lopez, *Remittance Landscape*; Coleman, 'U.S. Statecraft'; Anna J. Kim, Josh M. Levin and Nisha D. Botchwey, 'Planning with Unauthorized Immigrant Communities: What Can Cities Do?' *Journal of Planning Literature* 22, no. 1 (2018): 3–16; Matthew B. Sparke, 'A Neoliberal Nexus: Economy, Security, and the Biopolitics of Citizenship at the Border', *Political Geography* 25, no. 2 (2006): 151–180; Claudia Sadowski-Smith, *Globalization on the Line: Culture, Capital, and Citizenship at U.S. Borders* (New York: Palgrave, 2002); Joachim K. Blatter, 'Debordering the World of States: Towards a Multi-Level System in Europe and a Multipolity System in North America? Insights from Border Regions', *European Journal of International Relations* 7, no. 2 (2001): 175–209; Peter Andreas and Timothy Snyder, eds., *The Wall Around the West: State Borders and Immigration Control in North America and Europe* (Lanham: Rowman and Littlefield, 2000).
23. Joseph Nevins, *Operation Gatekeeper: The Rise of the 'Illegal Alien' and the Making of the U.S.-Mexico Boundary* (London: Routledge, 2002).
24. Ibid., 178, Mathew Coleman, 'Immigration Geopolitics Beyond the Mexico-U.S. Border', *Antipode* 95, no. 1 (2007): 54–76, 187.
25. Gilbert, 'Immigration as Local Politics', 29.
26. Coutin, 'Contesting Criminality'; Susan B. Coutin, *Legalizing Moves: Salvadoran Immigrants' Struggle for U.S. Residency* (Ann Arbour: University of Michigan Press, 2000).
27. Lopez, *Remittance Landscape*, 12; Dirk Hoerder and Nora Faires, eds., *Migrants and Migration in Modern North America: Cross-Border Lives, Labor Markets, and Politics* (Durham, NC: Duke University Press, 2011); Lynn Stephens, *Transborder Lives: Oaxacans in Mexico, California, and Oregon* (Durham, NC: Duke University Press, 2007).
28. Gilbert, 'Immigration as Local Politics'.
29. Monica W. Varsanyi, 'Neoliberalism and Nativism: Local Anti-Immigrant Policy Activism and an Emerging Politics of Scale', *International Journal of Urban and Regional Research* 35, no. 2 (2011): 295–311; 'Immigration Policy Activism in U.S. States and Cities', in *Taking Local Control: Immigration Policy Activism in U.S. Cities and States,* ed. Monica Varsanyi (Stanford: Stanford University Press, 2010), 1–27; Gerardo Francisco Sandoval, 'Immigrant Integration Models in "Illegal" Communities: Postville Iowa's Shadow Context', *Local Environment* 20, no. 6 (2015): 1–23; Neil Brenner, 'Urban Governance and the Production of New State Spaces in Western Europe, 1960–2000', *Review of International Political Economy* 11, no. 3 (2004): 447–488.
30. Domenic Vitiello, 'The Migrant Metropolis and American Planning', *Journal of the American Planning Association* 75, no. 2 (2009): 245–55.
31. Varsanyi, 'Neoliberalism and Nativism'; Gilbert, 'Immigration as Local Politics'; Sandoval, 'Immigrant Integration Models'; Kim et al., 'Unauthorized Immigrant Communities'.
32. Gilbert, 'Immigration as Local Politics', 27.
33. Anna Pratt, *Securing Borders: Detention and Deportation in Canada* (Vancouver: University of British Columbia Press, 2005).
34. Gilbert, 'Immigration as Local Politics'; William Walters, 'Border/Control', *European Journal of Social Theory* 9, no. 2 (2006): 187–203, 191.
35. Gilles Deleuze and Félix Guattari, *Nomadology: The War Machine*, trans. Brian Massumi (Cambridge, MA: MIT Press, 1986), 52; Stephen Cairns, ed., *Drifting: Architecture and Migrancy* (New York: Routledge, 2004), 1–2.
36. Lopez, *Remittance Landscape*, 10.
37. LeCavalier, *Rule of Logistics*, 4.
38. Lyster, 'Landscapes of Exchange', 235.
39. Alejandro Portes and Ruben G. Rumbaut, *Immigrant America,* 3rd Edition (Berkeley: University of California Press, 2006); Mary E. Odem, 'Unsettled in the Suburbs: Latino Immigration and Ethnic Diversity

in Metro Atlanta' in *Twenty-First Century Gateways: Immigrant Incorporation in Suburban America* ed. Audrey Singer, Susan Hardwick, and Caroline B. Brettell (Washington DC: Brookings Institute, 2008), 105–136.

40. LeCavalier, *Rule of Logistics*, 70–71.
41. US Immigration and Customs Enforcement Online Detainee Locator System, https://locator.ice.gov, accessed 22 March 2018.
42. Richard Hanley, ed., *Moving People, Goods, and Information in the 21st Century: The Cutting-Edge Infrastructures of Networked Cities* (Milton Park; New York: Routledge, 2004).
43. Alison Parker, 'Lost in Detention: Where Suspects, by the Thousands, Disappear', The Marshall Project. 4 March 2015, https://themarshallproject.org.
44. James Hollifield, Valerie F. Hunt, Daniel J. Tichenor, 'The Liberal Paradox: Immigrants, Markets and Rights in the United States', *SMU Law Review* 67 (2008): 67–98.
45. Mathew Coleman, 'U.S. Statecraft'.
46. Bob Jessop, *State Theory: Putting Capitalist States in their Place* (University Park, PA: Pennsylvania State University Press, 1990), 234; Coleman, 'U.S. Statecraft'.
47. Michel Foucault, *Discipline and Punish: The Birth of the Prison,* trans. Alan Sheridan (New York: Vintage Books, 1979), 141.
48. Flynn, 'Kidnapped, Trafficked, Detained?'; Michael Flynn, 'From Bare Life to Bureaucratic Capitalism: Analyzing the Growth of the Immigration Detention Industry as a Complex Organization', *Contemporary Readings in Law and Social Justice* 8, no. 1 (2016): 170–97.
49. Ruben Hernández-León, *Metropolitan Migrants: The Migration of Urban Mexicans to the United States* (Berkeley: University of California Press, 2008).
50. Ninna Nyberg Sørensen and Thomas Gammeltoft-Hansen, 'Conceptualizing the Migration Industry', in *The Migration Industry and the Commercialization of International Migration* ed. Thomas Gammeltoft-Hansen and Ninna Nyberg Sørensen (New York: Routledge, 2013).
51. Giorgio Agamben, *Homo Sacer: Sovereign Power and Bare Life,* trans. Daniel Heller-Roazen (Stanford: Stanford University Press, 1998).
52. Michael Flynn, 'Kidnapped, Trafficked, Detained?', 603.
53. LeCavalier, *Rule of Logistics*, 6.
54. National Immigrant Justice Centre, http://immigrantjustice.org, accessed 22 March 2018.
55. Grassroots Leadership, https://grassrootsleadership.org, accessed 22 March 2018.
56. Immigration Policy Center, https://americanimmigrationcouncil.org, accessed 22 March 2018; Kim et al., 'Unauthorized Immigrant Communities'.
57. Penn State Law Center for Immigrant Rights, *Imprisoned Justice: Inside Two Georgia Immigrant Detention Centers* (Report) (Atlanta: Project South, 2017), https://projectsouth.org.
58. A 2018 US Supreme Court decision, *Jennings v. Rodriguez*, ruled that detained immigrants do not have statutory rights to periodic bond hearings, and that they can be held indefinitely. https://supremecourt.gov, accessed 22 March 2018.
59. Jacqueline Stevens, 'When Migrants are Treated Like Slaves', *New York Times*, 4 April 2018; Northeastern University Buffett Institute for Global Studies Deportation Research Center, http://buffett.northwestern.edu.
60. American Civil Liberties Union, 'Rodriguez, et al. v. Robbins, et al. – Prolonged Detention Fact Sheet', https://aclu.org, accessed 22 March 2018.
61. Erik Larson, 'Captive Company', *Inc.,* June 1, 1988. https://inc.com.
62. Marc Levinson, *The Box: How the Shipping Container Made the World Smaller and the World Economy Bigger* (Princeton: Princeton University Press, 2006).
63. Guillermo Cantor, '*Hieleras* (Iceboxes) in the Rio Grande Valley Sector: Lengthy Detention, Deplorable Conditions, and Abuse in CBP Holding Cells', 17 December 2015, American Immigration Council, https://americanimmigrationcouncil.org.
64. Sarah Lynn Lopez, 'States of Incarceration: an

Architectural Perspective on Immigrant Detention in Texas', *Museums & Social Issues* 12 no. 1 (2017): 33–40, Norman Johnston, *Forms of Constraint: A History of Prison Architecture* (Chicago: University of Illinois Press, 2006).

65. Corrections Corporation of America, http://correction-scorp.com, accessed 22 March 2018.
66. Tings Chak refers to the absence of Canadian detention centre architectural representation as 'undocumented', and uses comics to fill the void. Tings Chak, *Undocumented: The Architecture of Migrant Detention* (Montreal; Amsterdam: The Architectural Observer, 2014).
67. Lopez, 'States of Incarceration', 36.
68. Penn State Law Center for Immigrant Rights, *Imprisoned Justice.*
69. Reports in South Texas describe children removed from their families and detained in separate facilities. Manny Fernandez, 'Inside the Former Walmart That Is Now a Shelter for Almost 1,500 Migrant Children', *New York Times*, 14 June 2018. https://nytimes.com
70. Penn State Law Center for Immigrant Rights, *Imprisoned Justice*.
71. Lopez, 'States of Incarceration', 38.
72. Tara Tidwell Cullen, National Migrant Justice Center, http://immigrantjustice.org, accessed 22 March 2018.
73. Walmart superstores and military camps are now being repurposed as architectures for detention. See note 69.
74. Nina Bernstein, 'Officials Hid Truth of Immigrant Deaths in Jail', *New York Times*, 9 January 2010. http://nytimes.com; Global Detention Project, United States Immigration Detention Profile, May 2016, https://globaldetentionproject.org.
75. Easterling, 'Zone'.
76. Yossi Sheffi, *Logistics Clusters: Delivering Value and Driving Growth* (Cambridge, MA: MIT Press, 2012); LeCavalier, *Rule of Logistics*.
77. Lopez, 'States of Incarceration'.
78. Transcor America, LLC, https://transcor.com, accessed 22 March 2018.
79. Vivian Lee, '"Please, God, Don't Let Me Get Stopped": Around Atlanta, No Sanctuary for Immigrants', New York Times, 25 November 2017, https://nyti.ms.
80. Audrey Singer, 'The Rise of the New Immigrant Gateways' (Washington DC: Brookings Institution, 2004).
81. Mary E. Odem, 'Subaltern Immigrants', *Interventions* 10, no. 3 (2008): 359–380.
82. Stephen J. Ramos, 'Planning for Competitive Port Expansion on the U.S. Eastern Seaboard: The Case of the Savannah Harbor Expansion Project', *Journal of Transport Geography* 36 (2014): 32–41.
83. Colliers International, *Savannah*, https://colliers.com, accessed 22 March 2018.
84. Odem, 'Subaltern Immigrants'.
85. Partha Chaterjee, *The Politics of the Governed: Reflections on Popular Politics in Most of the World* (New York: Columbia University Press, 2004), 74; Odem, 'Subaltern Immigrants', 368.
86. CoreCivic webpage, http://corecivic.com, accessed 22 March 2018.
87. Jacqueline Stevens, 'Introduction' in *Citizenship in Question: Evidentiary Birthright and Statelessness* ed. Benjamin N. Lawrence, Jacqueline Stevens (Durham; London: Duke University Press, 2017), 4.
88. See also Chak, *Undocumented.*

Biography

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Colonial and Postcolonial Logistics

Giulia Scotto

Introduction

This article addresses the logistical aspects of colonial and postcolonial governmental practices and the way in which such practices structured the African territory. In particular, it focuses on Zambia (Northern Rhodesia at time of British domination), a landlocked country located in the centre of Southern Africa, whose historical evolution, since it was conquered at the beginning of the twentieth century, is deeply intertwined with the discovery, extraction and export of copper and with the import of fossil fuel. It does so by presenting a series of episodes of Zambian history, from its foundation until the early postcolonial phase.

In the first part of the text, I introduce the concept of 'colonial logistics' intended as the modification of territories for military and political domination, and the extraction and export of resources. Through the observation of Northern Rhodesia, its foundation, its territorial delineation and the first planning of its capital city, the article demonstrates how European states, especially in the early colonial era, did not aim at governing the colonies with the same uniformity and intensity that was applied to their own territories, but rather to define a rational and controllable geography of lines and enclaves in order to efficiently control and exploit African resources. With the goal of efficiency, the logistical governmental mode of colonial power expanded the planetary infrastructure of capitalist accumulation and rearranged new territorial structures and hierarchies at different scales.

In the second part of the article, I show how, after independence, Zambia dealt with a complex geopolitical entanglement, partially inherited from colonial planning and partially generated by the end of direct forms of imperialism, which required the rerouting of the export and import of resources and the rebalancing of uneven territorial structures. To do so, the postcolonial nation state re-applied the instruments inherited by the 'colonial logistic' but, for lack of resources and expertise, it opened the door to a set of international patrons.

The analysis of infrastructure development in postcolonial Zambia illustrates the competing strategies through which imperialist powers attempted to secure a new form of control on Africa and elucidates the role of logistics as a decisive tool to shape the African territory at the various scales.

Colonial logistics

> In modern philosophical thought and European political practice and imaginary, the colony represents the site where (…) "peace" is more likely to take on the face of a "war without end". (Mbembe, 2003)[1]

Now broadly considered as the sum of infrastructures and processes needed to efficiently relocate goods from the point of production to the point of consumption, the notion of logistics was initially associated with military operations such as the planning of defence systems, troops dislocation, and goods supply.

In the early colonial era, military expeditions and private industrial companies, both supported by Western governments, conquered and acquired African territories and administered, exploited and controlled them through the construction of railways and roads, the planning of urban settlements and military outposts, the arrangement of plantations, mines, and reserves, and the management of trading and exporting. This 'imperialism of free trade'[2], as it was defined by Gallagher and Robinson, was not aiming at imposing direct political control on the conquered land, but at its exploitation through military and paramilitary violence.

My thesis is that the hybrid nature of colonial administration merged the martial and the neoliberal characters of logistics, producing a governmental strategy that I define as 'colonial logistics'. Colonial logistics is about imposing rationality and efficiency on the unpredictable and the uncontrolled – wild lands, savage people and inefficient processes – in order to transform nature into a resource for commodity production and capital accumulation.[3] Colonial logistics produced specific spatial and social relations at the local, regional and continental scales.

Rhodesia Railway

Like many other modernist tendencies, logistics in its various forms found broader application in the colonies. Colonialists' first ally was the railway or 'the permanent way' as it was often called. In 'Railway Imperialims', Ronald Robinson observes how 'the railroad was not only the servant but also the principal generator of informal empire; in this sense imperialism was a function of the railroad'.[4] By drawing straight lines of steel, European engineers could impose their order on the unfriendly African landscape, control times and distances within unknown territories, and define a new geography of lines, points, nodes, axes, and cities they could understand and control.

The first colonial power to impose its presence on what would become Northern Rhodesia, was a private company, the British South Africa Company (BSAC) led by Cecil John Rhodes. In the second half of the nineteen century, Rhodes and his company's paramilitary forces acquired and ruled over vast African territories reaching from the Cape in the south to the Zambesi river in the north. The Chartered BSAC combined the role of a private enterprise with the legitimation of the Victorian state. It traded with local chiefs for land acquisition, built and owned railways, and extracted and exported metal ores and diamonds toward South Africa's ports.[5] [Fig. 1]

The oddly shaped territory of Northern Rhodesia, once part of the Lozi and Bemba empires, was the result of infrastructural expansionism, geopolitical contingencies and of the discovery of copper deposits.[6] Rhodes's imperial ambition was to expand the 'Rhodesia Railway' to the north, in order to reach the British colonies on the Mediterranean Sea through the envisioned, legendary 'Cape to Cairo Railway' but, after crossing the Zambesi river at the Victoria waterfalls, in 1905, the ambitious mission had to be aborted. Unable to cross German East Africa and the Belgian Congo, the railway was converted into an exporting tool for the copper deposits which were then discovered in the region.[7] Known to some of the oldest civilisations, since the invention of the telegraph and the telephone, copper had become the most needed non-precious metal for electrical and communication wiring.

The trains of the Rhodesia Railway, departing from Port Elizabeth or Durban, would stop in Wankie (Southern Rhodesia) to collect coal, and then proceed to the north. Once they reached the Copperbelt, coal was unloaded and used to activate the mining engines while copper was loaded and shipped southward to South Africa and Mozambique and from there to the whole world. [Fig. 2]

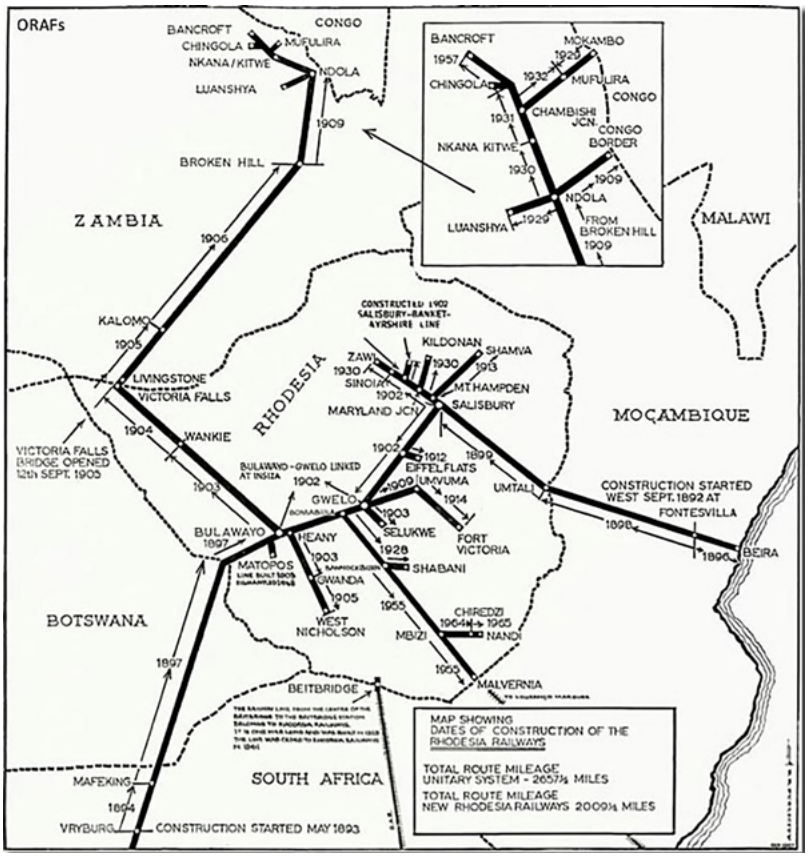

Fig. 1

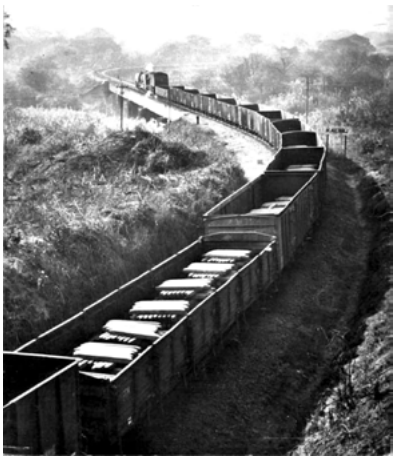

Fig. 2

Fig. 3

Fig. 1: Map of Rhodesia Railway with construction dates. Lusaka is not marked between Kalomo and Broken Hill. Source: https://www.britishempire.co.uk.

Fig. 2: Rhodesia Railway train exporting copper bars. Source: *Horizon*, February 1965.

Fig. 3: Lusaka old town, view from the north, about 1950. Source: George Kay, *A Social Geography of Zambia.* (London: University of London Press, 1971).

Thanks to the efficiency of the railway and the stable growth of the price of copper, the mining industry of the Copperbelt flourished and the railway line became the economic backbone of the colony. Most urban settlements, industries, and economic activities developed within a narrow area along the rail line while the sparse population lived of subsistence agriculture in the less accessible provinces.[8]

In 1924 the territories acquired by the BSAC through agreements with local chiefs were sold to the British government, who assumed administrative responsibility over Northern and Southern Rhodesia (now Zambia and Zimbabwe), and Nyasaland (now Malawi).[9]

In order to encourage European migration to Northern Rhodesia, the Colonial Office decided to set aside plots of land for exclusive European use. The most fertile, productive and accessible swaths of land – mainly along the railway and around the mines – were designated as 'Crown Land' and could be purchased by white settlers. Africans were not allowed to permanently reside on Crown Land and had to relocate to the 'native reserves'. The reserves soon became overcrowded and shortages of land and food pushed the African population to migrate towards the mining and urban areas seeking wage labour.[10]

In order to limit the flow of migration, the administration determined that only single African male workers were allowed to temporarily live around cities and mines but despite the limitation, the demographic imbalance between the urban and the rural areas kept on growing.[11] The divide between 'coloured' and white became a territorial and an urban issue, solved, at a different scales, with the definition of new borders and racial enclaves. The north-south orientation of the Zambian urbanisation pattern reflected the political and economic dependence of Northern Rhodesia on Southern Rhodesia and South Africa. This dependence would continue to affect her future development long after independence.

Railways were not the exclusive prerogative of the British empire; French, German, Belgian and Portuguese railways were also penetrating the continent, each of them with different aims and standards. The fragmented and outward-oriented logic of colonial infrastructures systems, together with the establishment of national and internal borders is the main cause of the current uneven geography of the continent.[12]

Lusaka

Lusaka, the capital of Northern Rhodesia from 1931, was established in 1905 as a technical stop on the railway line. Steam engines needed periodically to be refilled with water; therefore, the BSAC built loading and unloading platforms every twenty miles. Named after the chief of nearby Lenje Village, Lusaka was twenty miles north of the Chipongwe stop and offered a flat dolomitic soil and consistent water reservoirs. In 1906, when the railway construction ended at the border with the Congo, many who were left without work purchased farmlands in its surroundings. The White Fathers mission and the BSAC also settled in its proximity. Thanks to the growing farming activities, a marketing centre grew around the train stop where products were loaded and unloaded.

By 1913 the new settlement included a post office, a veterinary office, three mills for grinding maize and other grains, two lime kilns, a mission school serving the farmer's community, a government school, several shops, a small hotel, a rifle club and a sports' club. In the same year, the BSAC developed a simple master plan to control the growth of the township.[13] The railway and the dirt track running parallel to it – named 'Cairo Road' in memory of Rhodes's imperialist vision – constituted

the main axis of a linear gridded master plan expanding for two miles along the railway.[14] Logistic and storage spaces were located towards the rail line while the main public buildings and services sprang up along Cairo Road. White colonists also settled within the gridded structure while African workers lived in compounds south of the town. [Fig. 3]

In 1931 the colonial government of Northern Rhodesia decided to relocate its capital from Livingston to a more central location. Lusaka, which in 1931 had a population of four hundred and seventy Europeans, was chosen for its favourable position and pleasant climate. In 1935 a new master plan for the expansion of the capital city to the East of the existing settlement was developed by the British architect S. D. Adshead. The new capital was planned as a colonial, therefore racially divided, garden city of tree-lined boulevard and big plots for the Europeans' villas. Lusaka Old Town survived as the commercial core of the city.[15]

Originally deployed for military settlement, the grid became the preferred device for the structuring of new colonial settlements. The quintessence of all ordering structures, it was broadly used by colonisers as an instrument of space rationalisation. It recreated a known and recognisable environment and its compact layout provided feelings of urbanity and protection against the unfamiliar African landscape. With its image of scientific rationality, the grid, a non-figurative configuration with clear internal rules, can be read as the representation of the modern.[16] The exemplary grid of Lusaka's first master plan, in contrast to to the organic shapes of the existing local settlements, evokes the colonial administration's self-proclaimed civilising mission.

Zambia 1964–1965

In the late 1950s, the possibility of maintaining good post-independence economic relations and the presence of various private British companies in the most strategic areas of Africa convinced the British government to renounce to colonial sovereignty and negotiate the conditions for independence.[17]

In 1964, Kenneth Kaunda, leader of the nationalist movement from the early 1950s, became the first president of Zambia with the support of the United National Independence Party (UNIP). His own philosophy, was a mixture of 'Fabian socialism, nineteenth-century liberalism, Christian morality and idealisation of the communal values of Zambia's pre-capitalist past'.[18] Kaunda's domestic politics was characterised by socialist-oriented authoritarianism, which led to the creation of a state monopoly for manufacturing and trading companies, and the acquisition of 51% of the mining companies' shares.[19] At the same time, beyond political ideology, he maintained opportunistic and pragmatic foreign relations with Britain, the USA, the Communist Bloc, and the non-aligned movement.

In the year of its independence, Zambia was the third larger copper producer in the world (after the Congo and Chile), and exported between 50,000 and 60,000 tonnes of Copper a month. Copper constituted over 90% of Zambian export and almost 50% of government revenue.[20] During the 1960s, thanks to the high price of copper, Zambia was rated one of the most prosperous countries in Sub-Saharan Africa but its little-diversified economy depended heavily on copper price fluctuation and on its ability to negotiate favourable trading agreements with neighbouring countries in order to maintain the flow of copper and fuel.[21]

Throughout colonial domination and during the first year of Kaunda's government, all of the copper export and ninety-five percent of imports had been shipped via railway through the British controlled territories to the ports of South Africa, but after Southern Rhodesia's Unilateral Declaration of

Independence (UDI) of 1965, Zambia was forced to secure a new outlet to the sea.[22] The self-proclaimed independence of the Rhodesian white minority, condemned by Britain and unanimously by the United Nations, entailed a complete embargo on goods to and through the country.[23] The UN economic sanctions against Southern Rhodesia affected Zambia more than the ruling white elites of Rhodesia itself, who could still count on illegal South African and Portuguese supplies, through Mozambique and Angola. The effect of the trading ban on the Zambian economy revealed its dependency on foreign imports and on Southern Rhodesia's infrastructure.[24]

With the UDI, the border between Zambia and Southern Rhodesia became the border between independent Africa, in the north, and the white and colonial south. Tensions along this African iron curtain was worsened by the fact that Zambia and Tanzania, together with Cuba, the Soviet Union, Yugoslavia, and other socialist countries, were offering support and protection to armed groups fighting for freedom in Mozambique and Rhodesia.[25] Zambia found itself surrounded by enemy territories; the only accessible route toward the sea were the Benguela railway, running through the Congo and Angola, and the Great North Road, a dirt track passing through Tanzania.

The Benguela railway, built between 1903 and 1930 by the Portuguese government, connected the mining area of Katanga in the south of Congo to the Angolan port of Lobito on the Atlantic Ocean.[26] During colonial times Northern Rhodesia made little use of the Portuguese railway because of binding agreements between British-controlled protectorates. After the UDI, Zambia began to use the Benguela route but there were serious technical limitations to the railway's capacity, so it could not fully comply with Zambia's sudden request. Furthermore, the Congo and Angola were considered unstable commercial partners; the Congo, since its independence in 1960, was facing acute political tentions and Angola was still under Portuguese colonial rule.[27] [Fig. 4]

Tanzania, Zambia's most politically reliable neighbour, had been independent since 1961 and was governed by Julius Nyerere, who shared Kaunda's socialist and pan-Africanist believes. Despite the fact that both countries had been British colonies since WWI, the only physical connection between the two was the 'Great North Road', an unpaved track built in 1917 to convey British troops from Northern Rhodesia to the German East African front. Since then, Tanzania, together with Kenya and Uganda, was part of the British East African administrative unit which had almost no exchange with Northern Rhodesia and the British Central Africa Federation.[28]

Early in 1966, an oil airlift was organised by the British, American and Canadian air forces to solve Zambia's oil crisis. Cargo planes flew oil in from Dar es Salaam and Nairobi while trucks imported oil and exported copper via the Great North Road. This provisory solution proved inefficient; the cost of the air-lift was too high and a big quantity of oil was consumed by the heavily loaded planes. Furthermore, only a few months after the UDI, the unsurfaced and poorly engineered Great North Road became impassable.[29]

The closing of the border with Southern Rhodesia, the consequent lack of fuel and the stack of copper waiting to be shipped out of the country required a prompt and durable solution. Kaunda and Nyerere envisioned a double long-term answer to Zambia's isolation: an oil pipeline and a railway. Both infrastructures would run almost parallel to the Great North Road and connect Zambia to the Indian Ocean at Dar es Salaam. The pipeline had to supply oil to the mines while the 'freedom railway', as it was often called, would guarantee the flow of copper with the minimum need to import fuel and vehicles.

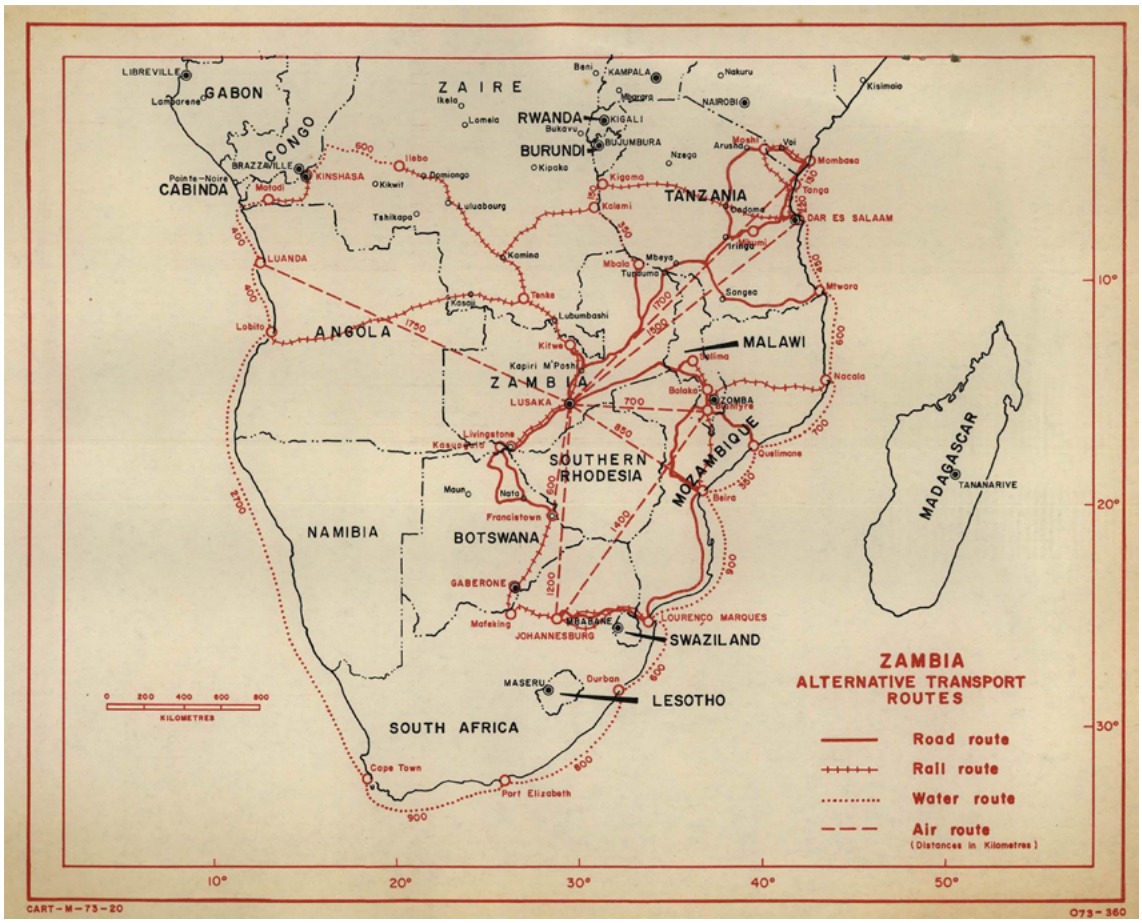

Fig. 4: Zambia's alternative transport routes after Southern Rhodesia's Unilateral Declaration of Independence. The Great North Road connects Lusaka to Dar es Salaam. Source: United Nations Economic Commission for Africa, Foreign Trade Routes of Zambia 1n 1973. Report No. E/CN.14/ECO/61, 8 June 1973.

With the construction of the new railway, presidents Kaunda and Nyerere hoped to increase self reliance and to distribute development and industrialisation to the sparsely inhabited but potentially fertile rural areas.[30] However, neither Zambia nor Tanzania could count on sufficient capital or knowledge to undertake the construction of such large-scale infrastructure.[31]

The diplomatic effort carried out by the two countries to gather foreign aid and assistance led to an unexpected but paradigmatic African Cold War situation where global political tensions intertwined with struggles for decolonisation and independence.

In 1966, the Zambian government awarded the Italian National Hydrocarbons Agency ENI (Ente Nazionale Idrocarburi) a contract to construct an oil pipeline from Dar es Salaam to the Copperbelt mining area. The Italian company's proposal unexpectedly defeated the bid of the British company Lonrho (London and Rhodesian Mining and Land Company), the historical industrial partner of the two Rhodesias during the colonial era.[32]

The railway project, on the other hand, had been dismissed by various western donors as uneconomic and unnecessary. After the refusal of Britain, the USA and the Soviet Union, in 1967 the People's Republic of China unexpectedly offered to build the rail link while the World Bank, adverse to the railway construction, but willing to participate in solving the crisis, granted loans to improve different sections of the Great North Road, renamed Tanzam Highway.[33] [Fig. 5]

Postcolonial logistics

Funding for the pipeline was raised by a consortium of Italian banks and offered to Zambia and Tanzania on soft-loan terms[34] while the engineering was carried out by SNAM PROGETTI, an affiliat of ENI. ENI, which promptly understood the commercial potential of decolonisation, started investing in Africa right after the end of the Second World War.[35] Supporting the independence claim of colonised countries and despite Italy's colonial past, ENI gained a new image of political neutrality within the Cold War, allowing it acces to the markets of various African nations.[36]

The construction of the pipeline started from ENI's refinery in Dar es Salaam in May 1967 and ended in the Zambian Copperbelt, where a terminal tank and a distribution system were developed in September 1968. A core team of Italian engineers and technicians was sent to Tanzania to collaborate with local workers. The fourty five thousand tons of steel pipe, imported from Italy via the Cape, because of the Suez Canal blockade, were transported along the dangerous Great North Road on trucks. The laying of the pipeline, which was completed sooner than forecast, comprised the clearing of the tropical forest, the excavation of a two-metre deep furrow and the positioning and welding of the pipes. The complex topography and the presence of game reserves, marshes and rivers made the enterprise particularly arduous. [Fig. 6, 7]

The pipeline, 1,680km-long and eight inches in diameter, carried refined oil products until 1975 when, based on the trust earned from the pipeline construction, the ENI group was appointed to build the first refinery of Zambia. The refinery allowed Zambia to buy crude oil directly from oil-producing countries and thus cut its energy dependence from colonial dealers and the oil cartel. The completion of the pipeline first, and of the refinery a few years later, were indeed received by Zambians as the first step towards real economic independence. During the inauguration of the pipeline in September 1968, President Kaunda declared that 'the completion of this pipeline … greatly improves the capacity to overcome our difficulties in the field of development' and that it 'is an example of our serious intent to work together … to develop the basis of self-reliance.'[37]

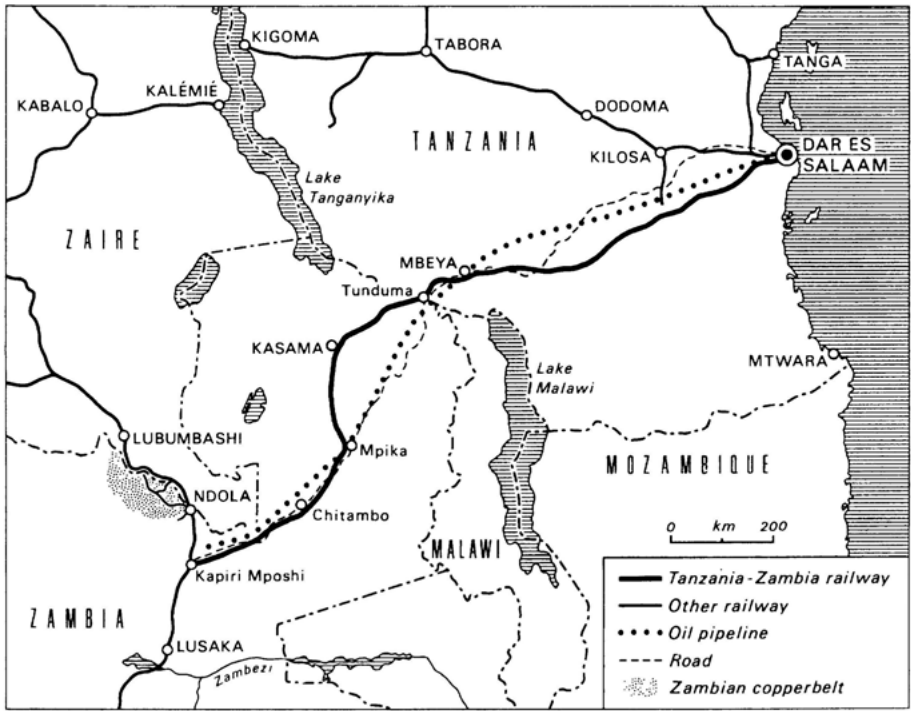

Fig. 5: The Dar es Salaam multimodal corridor. Source: Michael B. Gleave, 'The Dar Es Salaam Transport Corridor: An Appraisal', *African Affairs* 91, no. 363 (1992): 249–67.

Fig. 6: Construction of the Tazama Pipeline, 1967. Source: ENI Historical Archive, Rome.

The alignment and paving of the Tanzam highway started from Zambia and was completed in four years between 1968 and 1972. The World Bank's role was to collect the capital and supervise the project from a legal and technical point of view. Funding came from the Swedish government, the US, the UK and the Bank itself. The World Bank, created in 1944 at the Bretton Woods Conference to increase global 'productivity, employment, and living standards through international cooperation',[38] provided loans and assistance to low-income countries in order to 'foster an environment conducive to private foreign investment'.[39]

The project of the highway was divided into sections, each of which was the object of separate calls for bids for engineering and construction. This procedure was intended to 'enable smaller contractors to compete with larger firms and thereby help ensure competitive pricing'.[40] Most of the contractors were foreign companies that imported machinery and experts and made little use of local labour.

Construction moved slowly towards the Indian Ocean. Some observers noted at the time that the highway construction sites were used by western donors and by the World Bank to control the Chinese operation in Tanzania and Zambia.[41]

The improvement of the Great North Road was the less spectacular of the interventions along the Dar es Salaam transport corridor; the highway didn't require any secondary infrastructure and followed an existing road. However, after Rhodesia's unilateral declaration of independence and the rerouting of traffic toward Tanzania, the flow of trucks increased and the cities and the rural areas along the road became more and more linked to urban regions along the Rhodesia Railway.

After two years of negotiations and three years of surveys, the construction of the railway began in Dar es Salaam in 1970. The 'mobile construction site' proceeded at the average speed of three kilometres a day and reached the Zambian copper belt five years, three hundred bridges, twenty-one tunnels and ninety-three stations later. Together with the railroad, the project included the construction of peripheral infrastructure and services such as train stations, power plants, electric and water networks, offices, warehouses, workshops and industrial plants.

The Chinese state played a prominent role in all phases; it granted the interest-free loan and coordinated the project from the initial survey to the construction. The working team of the People's Republic of China deployed a labour-intensive strategy that was considered suitable for developing countries – Zambia, Tanzania, and China – with a shortage of capital and a surplus of underemployed manpower. Between twenty thousand and fifty thousand Chinese workers, engineers, supervisors, and doctors were sent to Africa to build bridges, tunnels, workshops, offices, stations, and housing for the railway authority's employees. The 310,000 tons of steel rails, together with cement and timber to integrate the local production had also to be imported from China.[42]

The stations were designed following a modular scheme. The smaller stations, occurring most commonly, were mainly deployed in sparsely inhabited areas. The L-shaped building was divided in two; half of the station served as waiting room, the other half as office space for railway workers. Medium-size villages were assigned medium-size stations, composed of a flexible number of modules articulated around the entrance space. The main stations, however, were specifically designed. Despite the fact that they had to cope with peculiar topographic and urban conditions, all main stations featured a monumental hall with a high ceiling and a glass façade. Other elements such as perforated

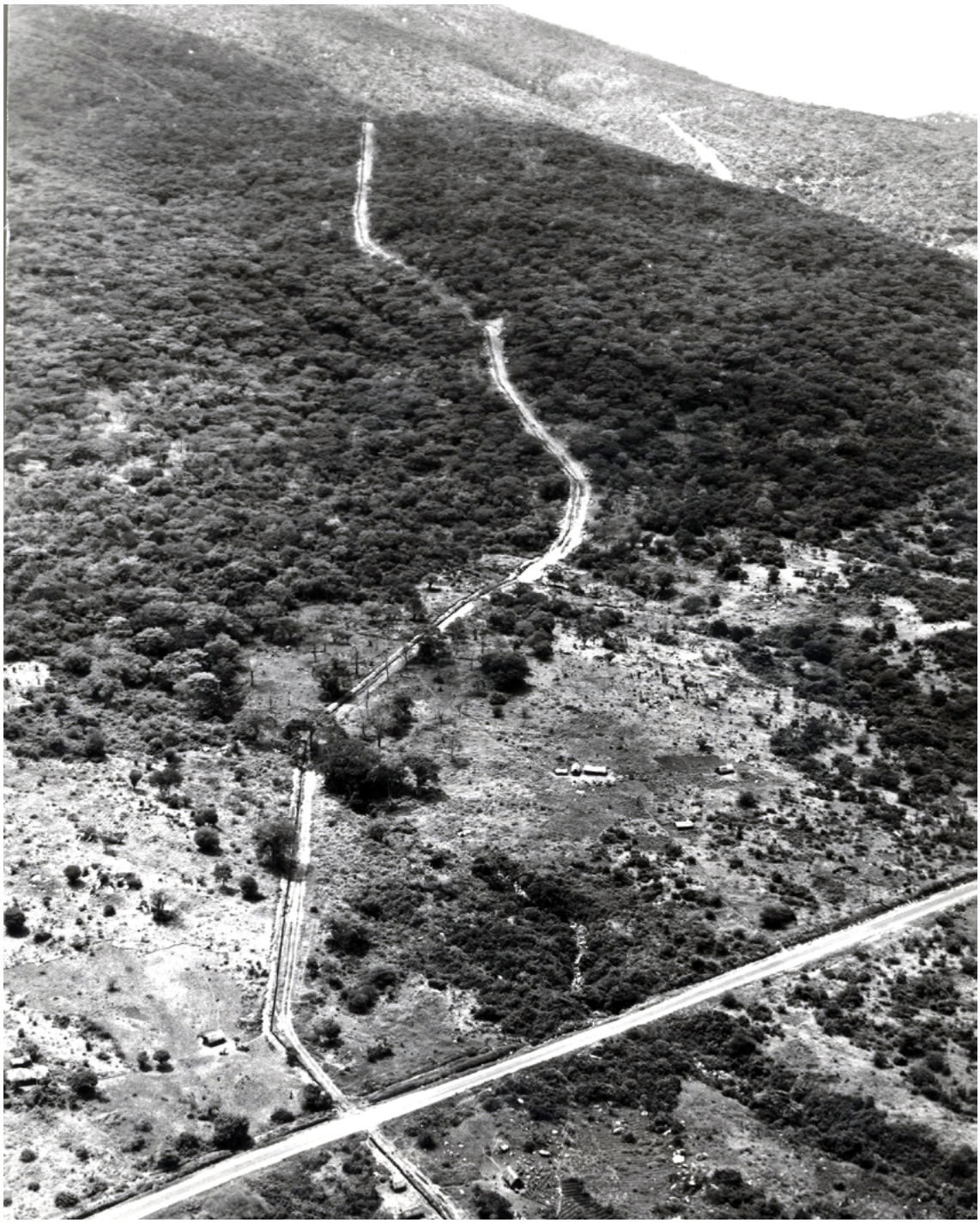

Fig. 7: The Tazama Pipeline and the Great North Road, 1967. Source: ENI Historical Archive, Rome.

panels, platform roofs and standardised graphic signage provided a uniform style to the different buildings. The overall consistent aesthetic of the Tazara (Tanzanian-Zambian Railway Authority) underlines its extra-statal nature: it is a territorial enclave designed by the People's Republic of China and managed by the railway authority.[43]

The careful design of the passenger train stations suggests an additional purpose of the railway: to increase the mobility of people living along the corridor and enhance their economic opportunities. With the cooling of the geopolitical situation in Southern Africa and the liberalisation measures of the 1980s and 1990s, small dealers who couldn't rent and fill entire cargo wagons, started shipping their goods as luggage on the passengers' 'ordinary train'. The 'ordinary train' became a moving market from which, twice a week, farmers and traders could buy and sell homegrown agricultural products or imported goods coming from the port of Dar es Salaam.[44] The unforeseen use of the railway as a small-scale logistic device radically changed the life of people living along the corridor.

African Cold War

> L'independence, c'est de bien calculer les interdependences. (Tjibauou, 1996)[45]

The spectacular and intrepid construction of the railway was widely reported in the Chinese and international media where it was advertised as the 'friendship railway', a 'common third world struggle against the forces of neo-colonialism'[46] based on solidarity among countries who shared a 'history of imperial conquest and colonisation.'[47] From the beginning of the Sino-African collaboration, Western newspapers envisioned what they called 'yellow peril',[48] the threat of communist propaganda and the spread of Maoism on the African continent. The Tanzanian and Zambian governments were indeed considered ideologically close to the communist bloc, even more after receiving China's assistance.[49] [Fig. 8]

More than Communism, though, Maoist China needed to export goods and establish new political alliances. After the Sino-Soviet split of the early 60s and the US embargo, the People's Republic of China was left politically and commercially isolated. The Chinese government, who lacked foreign currency to pay African workers and suppliers, proposed a commodity trading agreement to the Zambian and Tanzanian governments. The latter committed to selling, through their national wholesale corporations, a list of Chinese products whose revenues were used to pay salaries of African workers and local expenses.[50] Initially criticised for their poor quality, Chinese beers, bicycles, napkins and other goods started filling the shelves of Zambian shops. After an initial resistance, willing or not, Zambian consumers got used to the new products that were shipped from China to Zambia through Dar es Salaam and on the Tazara wagons.[51]

This historical episode, that brought together three different and competing actors – ENI, the World Bank, and the People's Republic of China – is paradigmatic of how the 'Global Cold War' unfolded outside the classic Eurocentric vision and determined neo-colonial dependencies.[52] The creation of the non-aligned movement, which Zambia joined in 1964, did not spare the Third World from the imperialist aims of the 'First' and 'Second World' and decolonisation made Africa the perfect prey for the First and Second worlds' hegemonic ambitions. With the withdrawal of colonial powers, emerged a new form of non-territorial conquest.

The competing actors involved in the rerouting of Zambian resources were all offering different recipes to achieve development. The railway and the highway, in particular, can be seen as an embodiment of the clash between a socialist vision

Fig. 8: Chinese poster depicting the construction of the Tazara railway, 1971. ‘Serve the revolutionary people of the world’. Source: Martin Bailey, *Freedom railway* (London: R. Collings, 1976).

of society, in which the state plays a prominent role and a capitalist vision of free-flowing commerce and increasing individual mobility.[53] While China proposed independence as the result of a collective effort, roads and automobility were promoted by the West as an instrument of decolonisation and emancipation. Despite the colliding interest of the different actors involved, the three infrastructures all contributed to the transformation and reorientation of the Zambian territory and show how logistics had to cope with 'political irrationalities' and historical contingencies.

Territorial decolonisation: between panafricanism and nationalism

Even though the main goal of the 'Dar corridor' was the rerouting of copper and oil, the postcolonial regime conveyed the new infrastructure projects into narratives of Pan African unity and nationalist decolonisation. Within Zambia, the new infrastructures became the embodiment of nation building and reorganisation of the territorial structure inherited from colonial planning.

Presidents Kaunda and Nyerere were strong supporters of the Pan-African ideals. They both believed in the principle of collective self-reliance and unity in opposition to colonial fragmentation, which they saw as the main reason for Africa's underdevelopment. The idea, both material and utopian, that networks of exchange and trade would bring wealth and peace was not an invention of Pan-Africanist politicians and intellectuals. A diffuse Saint-Simonian blind faith in communication and transport networks characterised modernist theories of development from the late colonial era onwards.[54]

During the inauguration of the Tazara head station in Kapiri Mposhi, President Kaunda declared that linking the newly founded African states would invert the colonial 'divide and rule' balkanisation strategy and that unity was the strongest weapon against imperialism.[55] The 'freedom railway' was seen – in opposition to the colonial 'Rhodesia Railway' – as the symbol of Zambia's decolonisation and freedom from the rule of the white-controlled south. Moreover, the newly established link between Zambia and Tanzania subverted the continental patterns of colonial fragmentation and brought together two fellow countries which had been kept apart by historical contingencies and external interests.[56]

Independent Zambia inherited the territorial imbalance created by the Rhodesia railway and the demarcation of Crown land and native reserves with the majority of people, industries and services concentrated along the Rhodesia Railway. Once the colonial anti-migration law was abolished, the urban population along the railway grew at an impressive speed while, away from the railway line, people were living on subsistence agriculture in the sparsely distributed villages and small towns.[57] A large percentage of the population was isolated and, most importantly, was not contributing to the country's wealth. Through the development of the corridor, the government was creating the conditions needed to transform subsistence agriculture into a cash crop economy and redefine national patterns of production and consumption. Furthermore, similar to the effect generated by the colonial railway, the Tazara was expected to attract the sparse population of the northwest province, making them easier to reach, control, tax and serve.

Within the nation-building process, the rail, the road and the pipeline served as a medium, but also as a message. Especially in the most remote and poorly served areas of the country, the newly built infrastructures became one of the few signs of the territorial presence of the new state. Indeed, both the railway and the pipeline were selected by Southern African and colonial military forces as a symbolic military target. Despite the protective fence installed

around the pumping stations, the pipeline was already bombed during the night of Christmas 1969, while railway bridges were bombed repeatedly in 1979, forcing the establishment of extraordinary security measures along the railway line.[58]

De-, Post- or Neo- Colonisation

The end of colonial direct domination marked the beginning of a phase that could ideally lead to radical political, economic and territorial redefinitions such as the constitution of a new continental political power or the reaffirmation of precolonial non-territorial strategies of government. In 1963 Kwame Nkrumah – first president of Ghana and co-founder of the Organisation of African Unity (OAU) – proposed the creation of a continental political subject in order to avoid the balkanisation of the continent into dozens of independent states. His idea of complete solidarity and political unity was soon dismissed and the OAU itself legitimised the creation of nation states and the inviolability of their boundaries.[59]

Despite the efforts of some of the most radical African leaders, the nation state emerged as the universal form of government. Indeed, independence was not a sudden episode; it was the peak of a long process and the result of precise calculations. Colonial powers gave up sovereignty only after creating the conditions for their profitable future relations with the former colonies. Such conditions included the establishment of a local political elite and the development of nationalist sentiments, which could only lead to the creation of modern nation states.[60]

Soon after independence, the nationalist ambition of Zambian self-reliance clashed with the new state's difficulty to overcome its colonial cultural and territorial inheritance, and with the harsh reality and slowly-evolving extractive industry that relegated Zambia to the periphery of the global economy.[61] As Immanuel Wallerstein's world-system analysis suggests, within the logic of the global commodity market, different states occupy different positions. The role of the periphery is to provide raw materials and low value-added products for core countries that, by contrast, focus on higher-skill capital production.[62] This global spatial model clearly criticises the modernisation theory of progress as a temporal and univocal path from tradition to modernity according to which different areas of the world find themselves at different stages of development and move, at different speeds, towards the Euro-American living standards that they will reach at some point in time.[63]

Ironically, the struggle for independence and decolonised trade forced Zambia to open its doors to a set of new actors – foreign companies, foreign states and international organisations – who offered financial aid and technical support with the promise to enhance development and self-reliance. Fredrik Cooper's definition of postcolonial 'gatekeeper states' perfectly matches the conditions of post-independence Zambia where the price of and demand for copper, the state's main source of revenue, depended purely on external factors.[64] This fragile and externally oriented constellation forced the government 'astride the interface between a territory and the rest of the world, [into] collecting and distributing resources that derived from the gate itself': customs revenue and foreign aid.[65] The management of the export of resources and the supply of fossil fuels remained the main goal of the postcolonial regime whose only 'freedom' was to choose its commercial partners and political models.

The newly founded Zambian state sought to decolonise its territorial imbalance with the same instruments previously deployed by the BSAC and by the colonial administration, and with the support of new international patrons. Willing to define its autorithy over land and population, the postcolonial regime, unable to imagine alternative models

of development, invested in monumental and large-scale projects, adopting a slightly different form of 'colonial logistics'. The postcolonial geography of lines, nodes, and grids altered the colonial territorial structure but reproduced a geography based on resource extraction and control at the local and global scale: control of the Zambian population by the Zambian state, but also control of Zambian resources by external neo-colonial powers.

Notes

1. Achille Mbembe, 'Necropolitics', *Public Culture* 15, no.1 (2003): 11–40, 23. doi:10.1215/08992363-15-1-11.
2. 'Trade with informal control if possible; trade with rule when necessary.' John Gallagher and Ronald Robinson, 'The Imperialism of Free Trade', *Economic History Review*, VI (1953): 1–15.
3. 'The white man's "civilizing" burden was thus an essential part of developing natural resources, and making them available for commercial exploitation. The relationship of people to nature was transformed, from one based on responsibility, restraint and reciprocity to one based on unrestrained exploitation'. Vandana Shiva, 'Resources,' in *The Development Dictionary,* ed. Wolfgang Sachs (London: Zed Books, 2009), 250.
4. Ronald E. Robinson, 'Introduction: Railway Imperialism', in *Railway Imperialism*, ed. Clarence Baldwin Davis and Kenneth E. Wilburn (New York: Greenwood Press, 1991), 2.
5. Jon Lunn, 'The Political Economy of Primary Railway Construction in the Rhodesias, 1890–1911', *The Journal of African History* 33, no. 2 (1992): 239–54.
6. Andrew Roberts, *A History of Zambia* (New York: Holmes & Meier, 1976), 149–185.
7. Jan-Bart Gewald, *The Speed of Change: Motor Vehicles and People in Africa, 1890–2000*, vol. 13, Afrika-Studiecentrum Series (Leiden: Brill, 2009). http://sfx.metabib.ch, 22.
8. Alan J. F. Simmance, International Urbanization Survey, and Ford Foundation, *Urbanization in Zambia* (New York: International Urbanization Survey, The Ford Foundation, 1972).
9. Roberts, *History of Zambia*, 149–185.
10. Ibid.
11. World Bank, *Zambia – Urban Sector Survey (Vol. 2): Annexes (English)* (Washington, DC: World Bank, 1976). http://documents.worldbank.org
12. Achille Mbembe, 'At the Edge of The World: Boundaries, Territoriality, And Sovereignty in Africa', *Public Culture* 12.1 (2000): 259–284.
13. George Kay, *A Social Geography of Zambia* (London: University of London Press, 1971), 112.
14. Cairo Road is one of the few colonial street names that survived Zambian independence. After 1964 it acquired a new Panafrican meaning. Karen Tranberg Hansen, *Keeping House in Lusaka* (New York: Columbia University Press, 1997), 2.
15. George Kay, *A Social Geography of Zambia* (London: University of London Press, 1971), 118.
16. Paola Viganò, *La Città Elementare* (Milano: Skira,1999), 139.
17. Frederick Cooper, *Africa Since 1940* (Cambridge: Cambridge University Press, 2002), 198.
18. Megan Vaughan, 'Exploitation and Neglect: Rural Producers and the State in Malawi and Zambia', in *History of Central Africa: The Contemporary Years since 1960*, ed. David Birmingham and Phyllis M. Martin, (London: Longman, 1998), 167–201.
19. Hugh Macmillan, '"The devil you know": The impact of the Mulungushi economic reforms on retail trade in rural Zambia, with special reference to Susman Brothers & Wulfsohn, 1968–80' in *One Zambia, Many Histories,* ed. Jan Bart Gewald, Hinfelaar Marja, and Macola Giacomo (Leiden: Brill, 2009), 191.
20. International Bank for Reconstruction and Development, International Development Association, *Tanzania Appraisal of the Second Highway Project*. Report No. TO-690a, 1969; International Bank for Reconstruction and Development. International Development Association. *Zambia Appraisal of the Second Highway Project*. Report No. TO-676a, 1968.
21. World Bank, *Zambia – Urban Sector Survey: Main text*

(English) (Washington, DC: World Bank, 1976). http://documents.worldbank.org

22. DeRoche, 'Can't fight guns with knives', in *One Zambia, Many Histories,* ed. Jan Bart Gewald, Hinfelaar Marja, and Macola Giacomo (Leiden: Brill, 2009), 82.
23. 'United Nations: Security Council Resolution Authorizing United Kingdom to Use Force to Prevent Oil Deliveries to Southern Rhodesia', *International Legal Materials* 5, no. 3 (1966): 534.
24. DeRoche, 'Can't fight guns with knives', 83; I. L. Griffiths, 'The Tazama Oil Pipeline', *Geography* 54, no. 2 (1969): 214–17.
25. Clapperton Chakanetsa Mavhunga, 'A Plundering Tiger with Its Deadly Cubs? The USSR and China as Weapons in the Engineering of a "Zimbabwean Nation", 1945–2009', in *Entangled Geographies: Empire and Technopolitics in the Global Cold War*, ed. Gabrielle Hecht, (Cambridge, MA: MIT Press, 2011), 237.
26. William A. Hance and Irene S. Van Dongen, "The Port of Lobito and the Benguela Railway." *Geographical Review* 46, no. 4 (1956): 460-87. doi:10.2307/212105.
27. Martin Bailey, *Freedom Railway* (London: R. Collings, 1976), 12.
28. Ibid.
29. Michael B. Gleave, 'The Dar Es Salaam Transport Corridor: An Appraisal', *African Affairs* 91, no. 363 (1992): 249–67.
30. 'The Great North Road provides access to an area of nearly 60,000 square miles with a population of about 600,000.' International Bank for Reconstruction and Development. International Development Association. *Zambia Appraisal of a Highway Reconstruction Project*. Report No. TO-525b, 1966.
31. In 1963 fewer than one hundred Zambians held university degrees and fewer than a thousand had a secondary school certificate. Roberts, *History of Zambia*, 234.
32. Andrew Cohen, 'Britain and the Breakdown of the Colonial Environment: The Struggle over the Tanzam Oil Pipeline in Zambia', *Business History Review* 88, no. 4 (2014): 737–59. https://doi.org/10.1017/S0007680514000749.
33. Bailey, *Freedom Railway*; Hall and Peyman, *Great Uhuru Railway*; Jamie Monson, *Africa's Freedom Railway: How a Chinese development project changed lives and livelihoods in Tanzania* (Bloomington: Indiana University Press, 2009).
34. Soft loans are usually granted by governments to development projects; they have a lower interest rate than the standard market rate.
35. Prior to the construction of the Tazama Pipeline, ENI had built refineries in Ghana, Tanzania, Morocco, and Congo, and it was extracting oil in North Africa and the Middle East. Elisabetta Bini, *La potente benzina italiana: Guerra Fredda e consumi di massa tra Italia, Stati Uniti e Terzo mondo (1945–1973)* (Rome: Carocci, 2013), 219.
36. In the notes written for a speech in Tunis in 1961, Enrico Mattei, president of ENI, wrote: 'I do not only believe in decolonization for moral reasons of human dignity but for economic and productivity reasons too.' Giuseppe Accorinti, *Quando Mattei era l'impresa energetica io c'ero* (Matelica: Hacca, 2008).
37. 'Oil together! – it is no longer a pipe dream'. *Times of Zambia*, 3 September 1968.
38. Amy L. S. Staples and Amy L. Sayward, *The Birth of Development: How the World Bank, Food and Agriculture Organization, and World Health Organization Changed the World, 1945–1965* (Kent, OH: Kent State University Press, 2006).
39. Ibid.
40. International Bank for Reconstruction and Development. *International Development Association. Zambia Appraisal of a Highway Reconstruction Project*. Report No. TO-525b, 1966.
41. Bailey, *Freedom railway*, 125.
42. Martin Bailey, *Freedom Railway*, 88–93.
43. 'As a site of multiple, overlapping, or nested forms of sovereignty, where domestic and transnational jurisdictions collide, infrastructure space becomes a medium of what might be called extrastatecraft—a portmanteau describing the often undisclosed

activities outside of, in addition to, and sometimes even in partnership with statecraft'. Keller Easterling, *Extrastatecraft: The Power of Infrastructure Space* (London: Verso, 2014).

44. Monson, *Africa's Freedom Railway*, 93–124.
45. 'Independence is the good management of interdependence'. Jean-Marie Tjibaou and Alban Bensa, *La présence kanak* (Paris: Jacob, 1996).
46. Bailey, *Freedom Railway*, 93–124.
47. Ibid.
48. Charles Mohr, 'Kaunda Leads Tanzam Rail Ceremonies', *New York Times*, 27 October 1970.
49. Bailey, *Freedom Railway*, 71–76.
50. Ibid., 65, 82–86.
51. 'Made in China', *Times of Zambia,* 27 July 1973.
52. Odd Arne Westad, *The Global Cold War: Third World Interventions and the Making of Our Times* (Cambridge: Cambridge University Press, 2005).
53. Monson, *Africa's Freedom Railway, 2.*
54. 'Through an increasingly mobile, globalized exchange of goods, information, and people, the time and distance that had traditionally kept human beings separated into antagonistic groups would soon be dissolved. The Saint-Simonians referred to this ideal as "universal association". The coming organic era would be characterized by global unity and cultural synthesis between nations, an end to wars, an end to class antagonisms, material prosperity beyond all previous reckoning, and unparalleled human creativity in every arena.' Richard Wittman, 'Space, Networks, and the Saint-Simonians', *Grey Room* (1 July 2010): 24–49. https://doi.org/10.1162/GREY_a_00004.
55. 'Uhuru Railway Opens Today', *Tanzania Daily News,* 23 October 1975.
56. Robert Gardiner, 'Distance and Development', *Africa: Rivista trimestrale di studi e documentazione dell'Istituto italiano perl'Africa e l'Oriente,* 1 (1973): 25–35.
57. Between 1963 and 1969 there was an estimated migration of 282,000 to the line of rail provinces. World Bank, *Zambia - Urban Sector Survey.*
58. Monson, *Africa's Freedom Railway; ENI Archive, 82–85.*
59. 'Pan-Africanism, however was becoming a relationship of states, not of people. Nkrumah's hope for a United States of Africa achieved little support from African leaders intent on protecting the sovereignty they had so strenuously fought for.' Frederick Cooper, *Africa Since 1940* (Cambridge: Cambridge University Press, 2002), 184.
60. Ibid.
61. 'The sub-structure of the periphery – the capitalist and extractive modes and relations of production – evolves slowly, but the super-structure – the politics and ideology of the state – are considerably more volatile. Given the organic links between the sub- and super-structure, the instability of the latter affects the continuity of the former'. Timothy M. Shaw, 'Beyond Neo-Colonialism: Varieties of Corporatism in Africa', *The Journal Of Modern African Studies* 20, no. 2 (1982): 239. doi:10.1017/s0022278x00024460.
62. Immanuel Maurice Wallerstein, *World-Systems Analysis: An Introduction* (Durham, NC: Duke University Press, 2004).
63. Cooper, *Colonialism in Question: Theory, Knowledge, History* (Berkeley: University of California Press, 2005), 9.
64. Cooper, *Africa Since 1940*, 183–187, 156–161.
65. Ibid, 157.

Biography

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Blankness: The Architectural Void of North Sea Energy Logistics

Nancy Couling and Carola Hein

Introduction

Energy logistics is the management of intangible flows of petroleum, gas, electricity, and of their physical counterparts, such as cables, pipelines and drilling platforms. Since the mid-twentieth century, these systems and structures have been a major determining factor in the spatial configuration of the North Sea region. The structures of energy logistics are invisible – linear, frictionless, automated or buried, and cut off from public access; and omnipresent – vast, ubiquitous, and controlling increasing areas of both land and sea. Operating in the visual background, energy logistics shapes the form and function of the built environment. Its networks have created a framework for landside development and for marine spatial planning, yet the intensification of logistical activity has been accompanied by a paradoxical emptying of its spaces. The ocean's cultural value and social status has been evacuated in the process. This is a central paradox of logistical space: logistics is paramount to global urbanisation, yet the structures it produces are the elephant in the architectural dining room, too large to be ignored and too awkward to be discussed.

In response to the questions posed in this issue of *Footprint* – Have logistics accidentally created subversive architectural conditions despite their inherent anti-architectural tendencies? – we argue that energy logistics forms a series of subversive spaces in critical need of architectural intervention, both in order to expose and to enrich them. We focus on spaces of ocean-borne energy logistics and their landside extensions, which have developed into specialised, impermeable structures of energy extraction, transportation, transformation and storage around the North Sea. The tangible and intangible elements of energy logistics are a huge but largely invisible space. They are a key shaper of ocean urbanisation[1] and they are spatially and financially the most expansive layer of the global petroleumscape.[2] Architectural tools of mapping, analysis, and representation can render this space visible, describe its formal properties and invite public access and debate. In a preliminary step, these tools mediate the human position in the world and both question and clarify complex spatio-cultural relationships. The operators of energy logistics currently present its spatial impact to the public in an overwhelmingly linear, two-dimensional way, but architecture has a responsibility to seek out the full and often hidden dimensions of such mechanisms, including their social and political dimensions. In a second step, architecture can then propose new readings and articulate spatial potential.

Exploring energy logistics' impact on waters and coastlines through the example of the North Sea, this article first shows how this vast, rich, historic space has been transformed into a crowded industrial void. Petroleum has been a main driver of this process. Secondly, it explores the multiple and largely unrecognised ways in which energy logistics has shaped the surface of the sea and the invisible

sea-floor, and how together with legal and planning interventions, new unfamiliar structures are rapidly evolving. The third section examines energy logistics as it emerges from the sea and 'solidifies' at landings, and how existing UK port-towns are affected by mutations in the delivery system.

Despite its evasive nature, energy logistics has set up architectural conditions in each of these contexts. In the final section, we approach these conditions through the concept of blankness, as expressed in the writings of the architectural critic Jeffrey Kipnis and the philosopher and politician Roberto Mangabiera Unger. We propose that their ideas have the potential to interpret the conceptual void of energy logistics in a completely fresh manner, demanding new social meanings, political engagement, and architectural visions.

Part I: The emergence of the industrial void

The North Sea and its coastline stand as an example of a saturated space of logistics that is widely viewed by the public as a void. This paradoxical spatial condition has been gradually constructed by corporations and governments over several centuries, with an acceleration of the process due to industrialisation, low prices and availability after the Second World War. The diverse temporalities and fluctuating fortunes of energy logistics are illustrated in particular by the development of refineries in ports around the North Sea and the emergence of offshore extraction.[3]

In his comprehensive study of ocean space across historical phases and societies, Phil Steinberg discusses the evolution of a modern western idealisation of the ocean surface as a 'great void'.[4] Maritime cartography up to the sixteenth century had incorporated narrative features, expressing both real and imagined experiences at sea, but by the seventeenth century, the sea (as mapped by Dutch cartographer Frederik de Wit, for example) had become largely empty. [Fig. 1] Then eighteenth-century early industrial capitalism, rooted in landed place, conceptualised the ocean as non-developable void.[5] This transformation of the map reflects the growth of European sea-powers and their view of the sea as a place to exert and consolidate their political and economic strength. This did not mean territorial domination of the seas; rather, the mercantilist states, in particular the Netherlands and the United Kingdom, aimed to defend the unhindered sea-borne trade on which their economies were based.

The ocean void served nations and growing corporations at the time of industrialisation and changing energy consumption patterns. It was also a time when land masses were more and more settled and scrutinised. The use of petroleum first as lighting oil and then as engine fuel at the end of the nineteenth and in the early twentieth century encouraged investors to scale up industrial petroleum drilling and processing, creating a need to connect areas of production and consumption around the globe. Shipping was the cheapest solution for transportation from sites of production to sites of consumption. The perceived emptiness of the ocean disguised the rapid growth of petroleum shipping, first from the United States and later from around the world to the ports of the North Sea.

Scholars have recognised a correspondence between a nation's energy consumption and its material prosperity – since the use of coal to transform production methods in the industrial revolution in eighteenth-century Great Britain, energy consumption has continuously increased and living standards for the larger public have improved.[6] This tendency has led to the transformation of ocean space, coastlines, ports and cities through increased shipping of oil, logistical development and offshore energy production. In the early years, ports had been sites for importing, storing, and redistributing refined oil. Greater control over the process of production by the oil industry led to

Fig. 1

Fig. 2

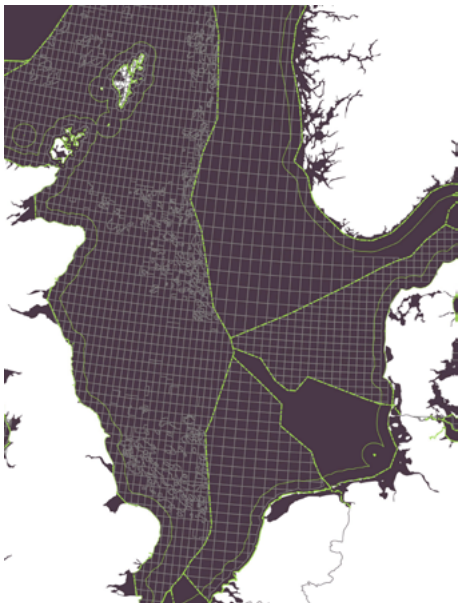


Fig. 3

Fig. 1: Olaus Magnus, Carta Marina 1949, full colour facsimile of the original 1539 edition. Source: Wikimedia Commons.

Fig. 2: Energy logistics, North Sea, December 2017. Source: www.havbase.no.

Fig. 3: National petroleum extraction grids, North Sea. Source: Nancy Couling.

also locating refineries at these port sites – a key element in petroleum logistics. Refining near places of consumption allowed corporate or public refinery owners to buy foreign crude oil from various locations, and to refine it into the necessary products near the places where they would be used.[7] Once set up, refineries and their supporting infrastructure are hard to move and remain as fixed ensembles despite the otherwise flexible pathways of oil flows. Thus, even as petroleum structures disappear, age, or fail, this configuration has its own rules that shape our future.

Meanwhile, the ocean itself is not only home to a temporary layer of petroleum shipping, it has also long hosted the long-term physical structures of extraction. In 1949, after Soviet engineers discovered offshore oil in commercial quantities, they built the Neft Daşları settlement, an extensive network of drilling platforms, housing, and leisure structures, around a hundred kilometres from Baku and fifty kilometres offshore. This 'town' heralded a new era of ocean urbanisation through oil. Twenty years later, the discovery of the Norwegian North Sea field of Ekofisk (1969) by Phillips, an American oil company, brought the topographic and geological properties of the northern European continental shelf sharply into focus for national and corporate petroleum companies, inciting them to drill in deeper and rougher waters. The last fifty years have seen vast spatial transformations related to energy logistics both on- and offshore, and a new unfamiliar logistical architecture in the offshore energy sector has begun to emerge. The North Sea is now one of the most industrialised seas in the world.[8]

Oil has a ubiquitous, pervasive presence within our society. The oil industry has inserted physical artefacts into ocean space that are small in comparison to the vast scale of the sea itself, but their presence is underpinned by rigid ordering systems of territorial dimensions.[9] These systems have been set up through legal devices, engineering, and world market logistics rather than integrated political/democratic planning processes. A variety of shields guard the border between the public and logistics spaces. Individuals require specialist knowledge, skills, and security clearances to enter these realms. For the public at large, who do not have passkeys, the ocean takes on an abstract, remote status that is home to select, highly specialised technical interventions.[10] If a commodity is kept at a distance and its materiality negated, its cultural dimension becomes equally challenging to excavate. The public imagination is steered by national and corporate advertisement campaigns. Hein's research, among others, unravels the representative imagery that cloaks the black and viscous oil and names the parties who dominate the production of oil narratives. Governments have issued celebratory visuals of oil infrastructure on official documents such as stamps and banknotes whereas corporations glorify the positive impact of petroleum through advertising, information booklets, and even art.[11] This is a dangerous fiction and at the same time a sleight of hand, since corporations and nations control the spaces of oil and gas in secrecy and concealment, making it extremely difficult to *site* as well as *sight*.[12]

The oil and gas industry is a multinational giant without a face, both ostensibly liberated from and inextricably implicated in state operations. Energy companies with identifiable leaders, such as John D. Rockefeller (the founder of Standard Oil) or Pakhuismeesteren (the local company that first stored oil in the port of Rotterdam), have evolved into a set of corporations with anonymous leadership, which is reflected in the industry's logistical spaces. Constantly 'swapping assets' and reconfiguring ownership constellations, the industry is also made up of numerous operators delivering specific services and has therefore mostly been able to avoid public liability. The largest oil spill in the history of the offshore industry, the 2010 Deepwater

Horizon disaster in the Gulf of Mexico, is a tragic illustration of this point.[13] Given the previously mentioned relationship between energy consumption and material prosperity, it comes as no surprise that the objectives of this industry resonate with neo-liberal practice in business and politics more generally, even though the UN led countries into the 2015 Paris Agreement over CO_2 emissions.

Journalists report a particularly contradictory relationship between the UK government's commitment to renewables and the important revenues gained from the oil and gas industry.[14] The US president has acted more directly and announced his withdrawal from the agreement in 2018 to support the country's oil industry.

The dominant presence of multinational energy corporations in ocean space has resulted in the erasure of a common non-industrial (non-oil-based) concept of the sea. We argue that the homogeneous, infinitely extendable extraction grid of the North Sea, created by nations under pressure from corporations, exemplifies Henri Lefebvre's notion of abstract space.[15] Lefebvre makes it clear that the state, having gained its sovereignty through latent or overt violence, goes about accumulating wealth and land, imposing administrative divisions, and 'aggressing nature' according to the rationality of accumulation.[16] He argues that the political principle of unification (of legislation, culture, knowledge, and education) is imperative to this project, without which it cannot be realised. National interventions work hand in hand with the demands of global corporations in the field of energy logistics. The establishment of 'unified' exploration legislation in the North Sea as discussed in Part II of this article, is a clear example. This principle of unification explains the simultaneously abstract and concrete character of the state's institutional space. Passing for absence, abstract space in fact conceals the presence of operational procedures and their results, and it is intrinsically violent.[17] The half-century of hydrocarbon extraction hinders any attempts to question petroleum narratives and practices.

Part II: North Sea energy logistics

Energy logistics dominates the space of the North Sea at the territorial scale, yet the material traces of this sector have been hard to decipher and pin down. The North Sea has historically formed the central logistical space of a highly active trading realm, which extended east to the Baltic Sea and the central European river system, west across the Atlantic and south to the Mediterranean. Traditionally a trading ground for the exchange of furs, grain, timber, and luxury goods, today the North Sea is characterised by the generation and exchange of energy – an indispensable, shapeshifting, and often invisible commodity.

The North Sea measures around six hundred kilometres at its widest part, a distance that the Vikings easily crossed in four to five days.[18] Frequent exchange across the sea meant coasts had more in common with their opposite shores than with their hinterlands. After the departure of the Romans around the first century AD, control of trade around the North Sea changed hands several times over the centuries, beginning with the Frisians (first to eighth century), followed by the Vikings (eighth to tenth century), and subsequently the Hanseatic League (eleventh to fourteenth century). All of these groups were highly skilled navigators who knew the seasons and the North Sea tides and currents; their logistical space was a kinetic, topographical zone filled with human activity and the narratives of first-hand experience. The Vikings did not use maps, but instead communicated navigational information through the spoken word. Before road- and rail networks, sea-crossings connecting to coastal and inland waterways comprised the major logistical space of northern Europe.[19]

Since the mid-twentieth century, North Sea oil and gas production has made a vital contribution to global energy supplies, occupying second place in combined offshore oil/gas quantities in 2006 after the Persian Gulf.[20] It is still the location of the most offshore rigs world-wide with a count of 184 in 2018.[21] The 185 million people living in the highly industrialised northern European countries of the North Sea watershed also consume the highest proportion of northern European energy. Yet despite North Sea oil and gas production, the EU as a whole is marked by a significant energy gap between supply and demand and is still 80 percent dependent on oil imports.[22] Energy logistics therefore not only laces through and around the North Sea extraction sites, but also carry out the functions of transport, storage, and relocation of oil and gas from external sources. The sea-surface and floor comprise the double 'motherboard' of northern European energy transactions.[23]

Energy logistics appears on the surface of the sea as a fleeting, yet continuous stream of shipping, which is becoming increasingly consolidated through electronic systems and dedicated deep-water routes. According to EU port statistics, liquid bulk goods headed the list of cargo handled by type at 38 percent in 2015, followed by dry bulk goods at 23 percent and containerised goods at 21 percent.[24] In Europe's top port of Rotterdam, crude oil, mineral oil products and liquified natural gas accounted for 40 percent of port throughput by weight in 2017, therefore more tons of liquid bulk goods travel through North Sea ports than containers.[25] Offshore shipping cargos, volumes, and frequencies are spatially elusive. The map in figure 2 translates data transmitted from the Automatic Identification System for the one-month period of December 2017 into a spatial format, rendering shipping pathways for the energy industry visible across the entire North Sea.[26] In addition to oil and gas tankers, the map also shows the routes of service vessels to and from offshore fields, revealing the North Sea's central seam dividing the Norwegian and UK Exclusive Economic Zones.

Not only a petroleum-based energy landscape, the North Sea is also coveted by the post-oil energy industry. Under current international objectives to reduce CO_2 emissions, formalised in the 2015 United Nations Paris Agreement, the North Sea has been earmarked by the EU as a favourable site for the rapid expansion of offshore wind-energy production.[27] Augmenting existing energy logistics, this sector's activities create additional logistical networks of component production (turbines, blades, transformers, monopoles, cables, foundations), assembly, servicing, and delivery routes. These uses compete for space with food production, transportation, military activities, sand and gravel extraction, fish and bird sanctuaries, and other protected natural areas. Intensification of all activities has resulted in spatial competition. In response, the EU now requires all littoral nations to produce Maritime Spatial Plans by 31 March 2021.[28] Originally a UNESCO initiative to improve cross-sector coordination of multiple maritime uses,[29] Marine Spatial Planning has since developed into a specialised discipline, for which educational institutions have set up courses and qualifications.[30] The North Sea has become a crowded and contested realm. Through these plans, the space of energy logistics clearly emerges in its full force. [Fig. 4]

The steady, periodic sea-surface of shipping is mirrored on the seafloor by an invisible template of cables and pipelines. As a liquid medium for systems of flow and exchange, the ocean itself is an environment of minimal friction, ease of transfer, and minimal boundaries. Here, legal structures are less solid than on land, where ownership principles have long legacies. Outside the twelve nautical mile territorial boundary, which in economic terms directly translates into tax advantages, the sea is

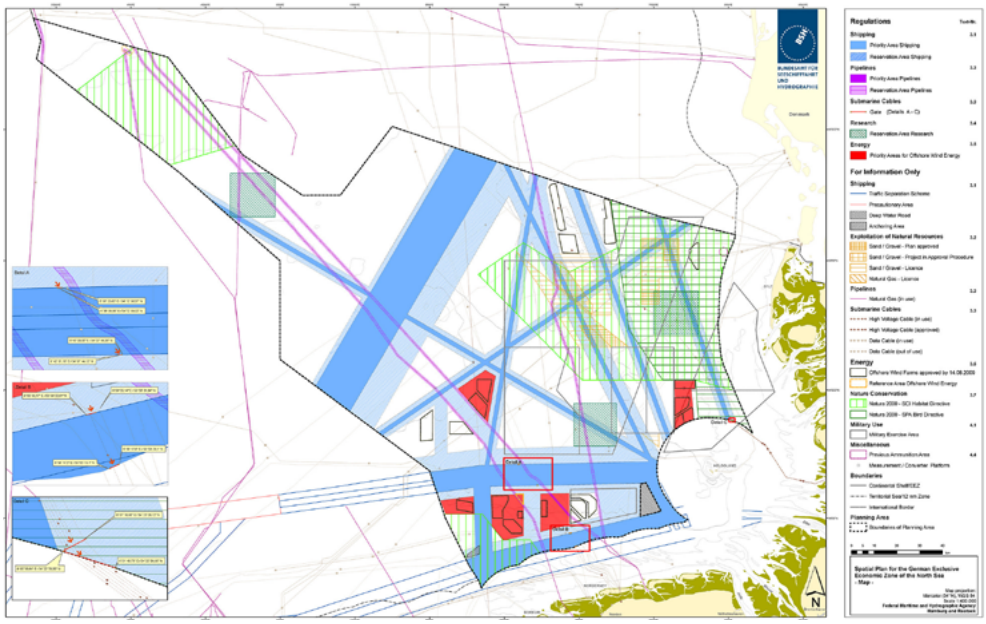


Fig. 4

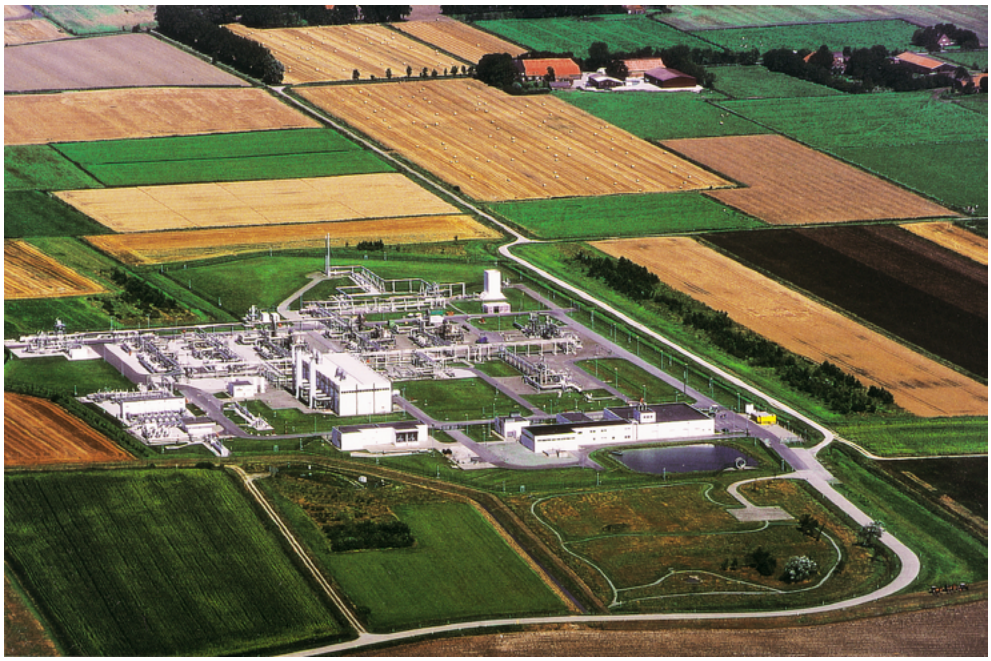


Fig. 5

Fig. 4: Spatial plan for the German North Sea, 2009. Source: BSH.

Fig. 5: Europipe I & II receiving terminal in Dornum in Northern Germany. Source: Statoil.

thus an ambiguous space.[31] The political neutrality of this space, its extra-territorial status endorsed by international law, and the relative technical ease of offshore operations, make subsea pipelines more attractive than overland options: 'Offshore lines minimise issues of land ownership and concerns of political instability.'[32] According to the UN Convention on the Law of the Sea, all states are entitled to lay or maintain cables and pipelines on the continental shelf, and coastal states cannot impede such activities.[33] This complex web of infrastructure supports offshore extraction sites. Oil and gas pipelines of differing sizes connect satellite platforms to each other as well as to the main facility on land, while fluids and 'umbilicals' – a combined string of steel pipes – deliver further fluids, controls, power, and communication from the land side. This ubiquitous, invisible underwater infrastructure will remain in place even when it is no longer used – unlike installations, according to decommissioning law pipelines are not subject to a legal requirement of disposal after use.[34] Some environmentalists argue that removing this infrastructure can often be more harmful to the marine habitat than leaving it in place. They therefore remain attached to the North Sea floor as permanent fixtures, unseen from above and evolving into new cyber seascapes as they are taken over by marine life. This logistic nervous system is threaded through the seafloor's very composite matter.

Above and beyond energy's physical infrastructure, the case of the North Sea demonstrates the expansive, rigid, invisible ordering systems within which offshore operations are embedded; a system that was swiftly established in response to the needs of the oil industry. The basis for offshore legislation was established at the second UN Convention on the Law of the Sea in Geneva in 1958, the UN response to heightened maritime territorial conflicts after the Second World War, in particular in relation to offshore oil and gas resources.[35] Following significant onshore gas finds in Groningen (the Netherlands) in 1959, the petroleum industry pressured the UK and Norwegian governments to proceed with national legislation on sovereignty over the seabed and natural resources, eager to explore the hydrocarbon potential of the continental shelf. In March 1965, the Norwegian and UK governments jointly agreed to divide the North Sea into quadrants according to the median line principle of one degree latitude by one degree longitude. On the Norwegian continental shelf, quadrants were then subdivided into twelve blocks of 15' latitude x 20' longitude, corresponding to about 10x25km, whereas the UK subdivision contained thirty smaller blocks. This continuous extraction grid formalised the offshore petroleumscape. It has become the state's framework for issuing licenses to exploration companies anywhere on the continental shelf. [Fig. 3]

International legislation further refined the occupation of the seas in the third UN Convention on the Law of the Sea of 1982, which established a 200-nautical mile offshore Exclusive Economic Zone for all coastal nations – a radical new spatial feature of unprecedented global proportions that consumes around 36 percent of the world oceans.[36] Planning activity was then unleashed as coastal nations began to organise this new offshore territory. Germany was the first European nation to produce legislative spatial plans for their part of the North and Baltic Seas in 2009, within which securing and strengthening safe and unimpeded shipping routes was a national priority. The plan's shipping corridors created large residual fields for wind-energy development – Germany's second economic priority. The dominance of logistical space in Maritime Spatial Planning is most vividly demonstrated in this plan. [Fig. 4]

Part III: The architecture of energy logistics

The transfer of energy from land to sea produces new interfaces and global geographies. We discuss the architectural results of this transfer through two instances: landings and mutations. At landings, the

infrastructure of energy logistics is inserted into landscapes outside of established towns, whereas mutations refers to the effects of energy logistics as it interacts with established urban areas, in particular ports. Energy logistics sustains and promotes movement, but at nodal sites of system transfer, more complicated processes take place and linear modules multiply and expand into industrial-scale plants that occupy large sites. Here, as Rania Ghosn argues, 'Energy needs space'.[37] Refineries, storage tanks, port facilities, and pipeline landings transform regional landscapes in ways that are foreign to established patterns of local settlement, in particular persistently avoiding the emergence of architectural form.

According to network theory, the spatial aspects of network behaviour are irrelevant to a system, which is based on the vertex and the edge – a path connecting vertices.[38] Notions of distance, density, and connectivity are mathematically defined according to the characteristics of these two elements. The urban planner and theorist Gabriel Dupuy named the three main criteria characterising modern urban networks: topological, kinetic and adaptive.[39] Networks direct energy logistics, which means that specific spatial phenomena result from the connections to established urban tissue. The shifting patterns of energy transfer are evident in the post-World War II transformation of coastlines and ports around the North Sea. Here, results of the restless mutations of neo-liberal seaborne logistics have produced different versions of architectural stagnation and blankness. Developers have exploited the spatial and legislative freedom of the vast unimpeded realm of the sea and expanded offshore energy logistics without coordinated planning. However, in order to distribute energy to user populations, they must negotiate the land-sea interface. This requires the convergence of cables and pipelines into restricted corridors. Energy logistics then emerges from the sea in visible form at unspectacular landings on sparsely populated sites – next to camping grounds on the East Yorkshire coast (UK), for example, or on the moors of Ostfriesland (Germany).

Landings inhabit morphological landscapes, but deny the architectural opportunity afforded by their volume, function, placement, and human dimension. Europipes I and II deliver gas from the Norwegian part of the North Sea, Europipe I in a direct line from the Draupner E riser platform, to within five kilometres of the German coastline.[40] From there they take a specialised pathway determined by the highly valuable and protected Wadden Sea ecosystem, which is listed under UNESCO World Heritage classification. The pipeline is steered through a tunnel lying seven to eight metres under the seabed to reach dry ground behind the dykes and arriving at the Europipe Receiving Facility (ERF) terminal just outside Dornum – a village with a population of around 4,600. At the receiving facility, the gas is measured and adjusted for transfer into the European onshore network involving preliminary filtering, pressure reduction, and reheating, since the gas has lost heat through the offshore segment. Thus such landings constitute a major planning exercise; the facility covers a site of eight hectares and includes a range of building types, which are however designed so as not to be there; 'In order to minimize the visual impact, a maritime design was implemented in the architecture of the ERF and some vegetation planting in the surrounding had been carried out.'[41] The project is architecturally mute, avoids contact with the adjacent town, is secured, and specialised. The 'designers' have not exploited the potential of expressing the ongoing material processes or the importance of this connection to European energy networks through architectural means. [Fig. 5]

It is deep in the earth where energy such as gas fills out a pre-defined form. The major European gas connections trace peripheral rings around main cities, converging at sites of storage. These patterns

of circulation still remain perfectly concealed and operate just outside established patterns of human settlement. But it is these locations that express our deep geological relationship to oil and gas. The cavern site Etzel in North Germany offers storage capacity for oil and gas within excavated salt formations over one thousand metres underground extending four kilometres vertically and twelve by five kilometres horizontally. Caverns accessed by boreholes are solution mined of the salt in vertical volumes ranging between about 250,000 and 700,000 cubic metres. A total of seventy-five caverns can hold forty-six million cubic metres of oil and gas with additional expansion potential in reserve. Initiated with thirty-three caverns in 1971 under the new government oil storage strategy as a response to unstable supplies and the oil crises, the site then slowly increased its gas storage capacity to forty-one caverns as the Europipe I and II came online in 1995 and 1999, respectively. The scale and shape of the total Etzel salt formation is indiscernible from above. Embedded in hollowed-out shapes resembling dormant, suspended cocoons, here energy momentarily escapes its logistic circuit to rest close to its own place of origin. [Fig. 6] Although unseen, in order to translate and communicate this immense geological scale to the public, architectural drawing and rendering techniques are used. It is through these drawings that potential channels of spatial understanding regarding the spaces of energy logistics, are offered.

The twin UK Humber estuary ports Grimsby and Immingham illustrate the types of *mutations* produced by networked energy systems as they interact with local urban conditions. A third port, Hartlepool, is an example of an unusual recovery strategy within mutating cycles of energy logistics. Until 1945 the UK had been mainly fuelled by coal, mined in the coal belts of central England, Wales, and Scotland and transported by rail to industrial towns and ports throughout the country. Grimsby's history exemplifies the restless changes in the energy industries, the pressure on ports for adaptive responses, and above all the ensuing trail of social and urban degradation. Grimsby was an important trading port across the North and Baltic Seas in cotton, salt, iron and agricultural machinery, and particularly in coal and timber.[42] Coal mined in the south Yorkshire coalfields was taken to Grimsby for short-sea shipment around the coasts to national destinations. After 1945, the increase in energy consumption combined with decreasing domestic coal production meant that British coastal ports imported coal to fuel their power stations.

To meet the increasing energy demand, the port of Grimsby was bypassed in favour of its neighbour, Immingham, and instead experienced a dramatic rise and fall in prosperity through the fishing industry. Between 1970 and 2013 the number of trawlers based in the port dropped from four hundred to five. Grimsby post-war housing estates were gripped by massive unemployment, making them the second most deprived in the UK. But the legacy of Grimsby's past wealth is still visible in the historic buildings of the fish docks, such as the Grimsby Ice Factory, and the Kasbah – a quarter of historic shops, smokehouses, and cafes, characteristic of the fishing industry's high period between the late nineteenth and early twentieth century – which is now nearly deserted and barely generating revenue. The Kasbah is currently a managerial question-mark for owners Associated British Ports – a blank with potential. In the port, the berths vacated by trawlers are slowly being replaced by new vessels employed in service of the expanding North Sea offshore wind industry.

Ahistorical, no-name ports offer advantages to energy logistics over ports with established towns. Around thirteen kilometres along the estuary from Grimsby, Immingham is only a small town, but it is the UK's first port in terms of tonnage and second in terms of value. A totally artificial construct, it was built by the Humber Commercial Railway and Dock

Company in 1906–12 primarily for the export of coal. The new Humber location was an alternative to extending the Grimsby port due to its naturally deep navigable channel, but before the construction of the railway and docks, Immingham was a village with a population of less than three hundred so labour for the developing docks came from Grimsby.[43] Port facilities here expanded after World War II with an oil terminal (1969), a bulk terminal for coal export and iron ore import (1970), a gas jetty for LPG import (1985), an international terminal for bulk cargo including coal (2000), and most recently the Renewable Fuels Terminal, which supplies imported wood pellets to Drax – the combined bio and coal power-station with the UK's highest generating capacity. These expansions occurred after mechanisation of port systems, therefore required limited additional labour. The Port of Immingham holds 28 percent of the UK's refining capacity, but its diversification across the energy spectrum demonstrates the level of port adaptability demanded by central nodes in the logistic system of UK energy delivery. It is an example of the type of port that is able to meet such requirements precisely because it is detached and anonymous – a port without a town.

Recent developments at Hartlepool reveal this UK port to be both a mutating site and a new type of landing. Hartlepool has a legacy of maritime industries suffering from economic decline. The thriving shipbuilding and steelwork industries experienced setbacks after heavy bombing in the Second World War. Subsequent de-industrialisation and the closure of the British Steel Corporation in 1977 contributed to the highest levels of unemployment in the UK at the time. Today a new generation of energy logistics is delivering a major commodity to Hartlepool and other specially equipped ports. These are severed topsides of decommissioned rigs. Topsides are literally the part of the rig above the waterline, functioning like petroleum factories with production facilities and accommodation, in this case for 160 people. On 2 May 2017, the topside from Brent Delta, a Shell-operated field in the northern North Sea, arrived at the northern UK port of Hartlepool for dismantling and resale as scrap metal by British company Able UK. [Fig.]

Landings for the logistical giants of such topsides are also highly specialised sites with heavily reinforced docks to handle the weight. Together, the ports of Grimsby, Immingham and Hartlepool demonstrate how cycles of specialisation, resource exploitation, decline and redefinition determine the network of energy logistics, steering its search for optimal routes and nodes. An estimated 1200 wells are to be plugged and abandoned and their structures removed from the North Sea in the foreseeable future, making decommissioning an important economic sector and a initiating a new chapter in the history of North Sea oil.[44]

Conclusion: the possibilities of blankness

The space of energy logistics across seas and coastlines is continually reorganised by nations and corporations in what Harvey and Brenner discuss as a process of 'creative destruction'.[45] This process produces differential, uneven spatial development in ongoing sequences that can destabilise established urban formats. Therefore, energy logistics plays a vital role in the shaping of the built environment both on land and at sea – a role in urgent need of recognition by professionals. Architects, engineers, logistic planners and lawyers must take on expanded and intersecting roles in order to find new forms and expressions for this century's spatial challenges, in particular across the land-sea interface. We urge for architectural interventions that critically reflect on questions of access and visibility, develop new typologies and programmatic overlays, and find architectural expression for the intersection of natural and cultural ecosystems generated by energy logistics.

In particular, infrastructural systems utilised by energy logistics have an important public dimension.

Fig. 6: Visualisation of storage caverns Etzel. Source: Storage Etzel GmbH.

Fig. 7

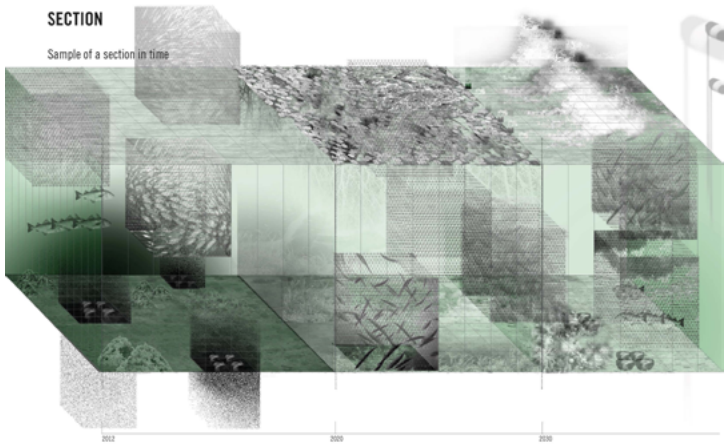


Fig. 8

Fig. 9

Fig. 7: Brent Delta topside at Able Seaton Port, Hartlepool, UK. Source: Able UK.

Fig. 8: Section: Barents Sea water-masses in flux. Source: Laba, EPFL.

Fig. 9: Barents Calling, perspective view. Source: Laba, EPFL.

Rather than being part of an extended public design brief, urban infrastructure has mostly been hidden underground, functionally restricted to strategic delivery tasks and taken entirely for granted. The question of its larger role in our relationship, for example with nature, has rarely been addressed. Architects Mason White and Lola Shepherd propose that infrastructure could potentially catalyse new economies that are adaptive and responsive to environment and use.[46] In this century, things we have previously buried and forgotten are returning with urgent environmental questions that we are ill equipped to answer. Geographers Maria Kaika and Erik Swyngedouw argue that it is exactly this hidden form of urban networks which has separated the 'processes of social transformation of nature from the process of urbanisation'.[47] Understanding the apparent spatial and conceptual blankness of energy logistics is the first step towards a conscious, meaningful, and inclusive design for their extended terrain: tracts of land, sea, and the connecting thresholds. The cases discussed here illustrate the ways in which energy logistics has refused architecture. However, we argue that interventions in this field should be fundamental to the field of architecture, and that architecture should not refuse energy logistics.

Jeffrey Kipnis discussed blankness as one of the five criteria for a new architecture alongside vastness, pointing, incongruity and incoherence/intensive coherence.[48] At the time (1993), he named this quality partly in relation to postmodern architecture, and blankness was a potential release from collage as the 'prevailing paradigm of architectural heterogeneity'.[49] The five criteria had first been formulated and introduced by the neo-modern social theorist Roberto Mangabiera Unger in 'The Better Futures of Architecture', his contribution to the Anyone conference in Los Angeles in 1991.[50] Unger called for architects to insist on new expressions of collective life in physical form, and for proposals describing 'possible futures for a more democratic society and a more empowered individual'.[51] He urged them to create a greater range of narratives, resist societal norms, and foster conflict between alternatives.[52] According to Unger, architecture must embrace the ambivalence of both pragmatic, established systems and inspirational, transcendent spatial ideas. In his concept of radical-democratic politics, an architectural vision is needed.[53] But such a concept and such a vision are critically lacking in the field of energy logistics.

The political dimension of Unger's argument resonates with the politics of energy logistics in the neoliberal market system. To differing degrees, this logistical space has, over the continuing course of industrialisation, devoured its counterparts of social and technical labour and of historical spaces of trade interaction. Smooth, efficient logistics developed in the service of the global economy cuts off social interactions: security zones at ports and around offshore wind parks and rigs prevent intrusion; compressed shipping turnaround times in ports hinder crews from making real social contact on shore. Energy logistics, particularly offshore, is still blank in architectural terms – that is, is we have not yet ascribed new democratic, socially-relevant meanings, heterogeneous human activities, cultural references or detailed forms of ownership to it. In the absence of such common meaning, nations and corporations have prescribed spatial patterns and constructed banal enclosures on land and at sea. The conversation between Kipnis and Unger on the notion of blankness calls to the general public to acknowledge energy logistics as a key player in the shaping of our built environment and for architects to consciously move into this domain of design, including its offshore spaces.

In stark contrast with the eighteenth-century vision of the sea as a great void and subsequent capitalist emptiness, for Kipnis, Unger's blankness

was architecturally optimistic and full of potential. It was neutral, non-ascribed, without formal reference, and combined with other criteria including vastness, could enable incongruous entities to enter into dialogue with each other while also avoiding 'traditional hierarchical spatial patterns'.[54] Kipnis's new architecture proposed large mute volumes formed by incongruous, unfamiliar geometries that set up unexpected relations to their surroundings and therefore enhanced the heterogeneity of the resulting spaces. We argue that considering oceanic water masses as vast, deep volumes rather than flattened planes can stimulate architectural thinking along the lines Kipnis intends. In addition to volume, they possess cores and density; properties normally associated with solids. While still unfamiliar to architects, these organic geometries are precisely determined according to the oceanographic parameters of depth, currents, bathymetry, temperature, and salinity.

In response to radical transformations generated by a neoliberal mode of operations, energy logistics developed and expanded unchecked across ocean space. Throughout this process, planners prioritised economic and logistic concerns, but erased the public in the process. How can the tools of an architect expand and dismantle this sectorial approach to design and communicate an integrated public vision? Rather than the largest periphery, the high seas are the largest public space on earth and require innovative approaches that can both capture the public imagination and develop scenarios in tune with the dynamics of the sea itself. Conceptions of heterogeneous diversified futures for energy logistics, particularly in offshore space, are lacking. Visions are required that can create awareness and inspire design research, extending the field of architecture beyond the shoreline and embracing the spatial challenges of the ocean. The sea is not a void or a tabula rasa, but a moving volume housing differentiated habitats and internal spaces, including inherited logistical systems. The role of architecture has long been to translate such functionalities into meaningful habitats. This essay argues that the blankness of sea-borne energy logistics, as a corporate strategy designed to make us look away, can – and must – do the opposite: attract attention and inspire architectural intervention. The alternative understanding of blankness discussed by Kipnis offers a way of responding to ocean volumes, celebrating architectural manoeuvring space and ultimately imagining such interventions.

Some designers are already taking on the challenge. The project illustrated in figure 8, 'Resources: A Territorial Strategy for the Barents Sea', demonstrates how the frameworks of established extraction grids can be usurped for new purposes and manipulated to engage with the fundamental spatial properties of the sea: kinetic, layered, emergent and periodic. This strategy uses the petroleum grid to set up a highly flexible fishing tool that manages shifting, four-dimensional fish-harvesting fields according to stock numbers and habitats over time. The gridded unit is an abstract coordinate reference over the full water depth, but is vertically subdivided into three zones; surface, middle and deep waters. The management tool opens different fields and layers for fishing, which change over time in response to the state of the fish stocks, since some species require longer recovery periods or may have been depleted due to other environmental factors.

A second architectural project, depicted in figure 9, proposes a new offshore typology. Combining the functions of search and rescue, vessel service, a swell-activated power plant, biofuel production, meteorological observation, and algae cultivation in vertical succession through a tower, this project reinterprets the lighthouse typology as a beacon and watchtower to protect both humans and the Barents Sea environment.[55] It stands at a strategic

position relative to search and rescue operations along the Northern Sea Route in the Barents Sea, its craggy outline offering migrating birds, mammals, and corals a range of resting places.

The North Sea has developed historically as a vital logistical space, first filled then emptied of large-scale human interaction, narratives, and imagery. The sea space is now planned, monitored, excavated, mobilised for transport, and operationalised for energy production. As environmental considerations become urgent and fish stocks collapse, as the climate changes and new generations of offshore infrastructure are both installed and dismantled, new architectural interventions are required which re-programme this logistical space with heterogeneous human activities and reinvigorate the public dimension of energy logistics and of our common ocean imagination.

Notes

1. Nancy Couling, 'Formats of Extended Urbanisation in Ocean Space', in *Emerging Urban Spaces- a Planetary Perspective*, ed. Philipp Horn, Paola Alfaro d'Alençon, and Ana Claudia Duarte Cardoso, The Urban Book Series (Springer International Publishing, 2018), XII, 219.
2. For further analysis of the petroleumscape and detailed exploration of some of the examples presented in this article, see: Carola Hein, 'Analyzing the Palimpsestic Petroleumscape of Rotterdam', *Global Urban History Blog* (2016) [https://globalurbanhistory.com]; 'Port Cities: Nodes in the Global Petroleumscape between Sea and Land', *Technosphere Magazine*, 15 April 2017; 'Between Oil and Water: The Logistical Petroleumscape', in *The Petropolis of Tomorrow*, ed. Neeraj Bhatia and Mary Casper (New York: Actar/ Architecture at Rice, 2013); 'Global Landscapes of Oil', in *New Geographies* 2: *Landscapes of Energy*, ed. Rania Ghosn (Cambridge, MA: Harvard University Press, 2009); Carola Hein and Mohamad Sedighi, 'Iran's Global Petroleumscape: The Role of Oil in Shaping Khuzestan and Tehran', *Architecture Theory Review* 21, no. 3 (2016): 349–374; Carola Hein, 'Oil Spaces: The Global Petroleumscape in the Rotterdam/The Hague Area', *Journal of Urban History* 44, no 5 (2018): 887-929. https://doi.org/10.1177/0096144217752460.
3. Carola Hein, 'Temporalities of the Port, the Waterfront and the Port City | PORTUS – Port-City Relationship and Urban Waterfront Redevelopment', *PORTUS: RETE Online Magazine* 29 (June 2015), http://portusonline.org.
4. Philip E. Steinberg, *The Social Construction of the Ocean*, (Cambridge: Cambridge University Press, 2001).
5. Ibid., 118.
6. Keith Chapman, *North Sea Oil and Gas: A Geographical Perspective* (Newton Abbot: David and Charles, 1976).
7. Carola Hein, 'Old Refineries Rarely Die' *Canadian Journal of History* (forthcoming).
8. European Committee (UK), 'The North Sea under Pressure: Is Regional Marine Co-Operation the Answer?', House of Lords Paper (London: House of Lords, 17 March 2015), https://publications.parliament.uk.
9. Nancy Couling, 'Urbanization of the Ocean; Extractive Geometries in the Barents Sea', in *Infrastructure Space*, ed. Ilka and Andreas Ruby (Berlin: Ruby Press, 2016).
10. Couling, 'Formats of Extended Urbanisation'.
11. Hein, 'Oil Spaces'.
12. Sheena Wilson and Andrew Pendakis, 'Sight, Site, Cite. Oil in the Field of Vision', *Imaginations: Journal of Cross-Cultural Image Studies* 3, no. 2 (2012): 4–5, http://imaginations.glendon.yorku.ca, accessed 9 July 2018.
13. Lance Duerfahrd, 'A Scale That Exceeds Us: The BP Gulf Spill Footage and Photographs of Edward Burtynsky', *Imaginations: Journal of Cross-Cultural Image Studies* 3, no. 2 (2012): 115–129, http://imaginations.glendon.yorku.ca, accessed 9 July 2018.
14. Felicity Lawrence and Harry Davies, 'Revealed: BP's Close Ties with the UK Government', *The Guardian*, 21 May 2015, https://theguardian.com.

15. Henri Lefebvre, *The Production of Space*, trans. Donald Nicholson-Smith (Oxford: Blackwell, 1991).
16. Ibid.
17. Ibid., 289
18. Michael Pye, *The Edge of the World : How the North Sea Made Us Who We Are* (London: Penguin Books, 2015).
19. Henk Engel et al., eds., *OverHolland 10: The Transformation of the Landscape of the Western Region of the Netherlands (9th to 21st Century)* (Amsterdam: Sun, 2011).
20. Lucien Chabason, 'Toward International Regulation of Offshore Oil Drilling?' in *Oceans: The New Frontier*, (Delhi: TERI Press, 2011), 216–19.
21. 'Number of Offshore Rigs Worldwide as of January 2018 by Region', Statistica (website), 2018, https://statista.com.
22. North Sea Commission, 'CPMR North Sea Commission – Integration Approach to Sustainable Development in the North Sea Region' (Brussels & Gothenburg: North Sea Commission, 27 November 2017), http://cpmr-northsea.org.
23. The motherboard of a computer system facilitates communication between electronic components, including peripherals.
24. Liquid bulk goods include crude oil, gasoline, diesel, liquefied natural gas, biofuels, liquid chemicals and edible oils & fats (eg palm oil).
25. Port of Rotterdam, 'Throughput Port of Rotterdam 2017', press release, 15 February 2018), https://portofrotterdam.com.
26. Introduced for vessels of a certain tonnage and function by the International Maritime Organisation (IMO) in 2004.
27. Multilateral Treaties Deposited with the Secretary-General, United Nations, New York, as available on https://treaties.un.org, accessed 3 June 2018.
28. The European Parliament and the Council of the European Union, 'Directive 2014/89/EU' (2014), http://eur-lex.europa.eu
29. UNESCO, Marine Spatial Planning website, http://msp.ioc-unesco.org, accessed 3 June 2018.
30. Currently a Master in Maritime Spatial Planning programme is available at IUAV, Venice; see their website: http://iuav.it.
31. This gave the undersea-routing option for the Nord Stream double gas pipeline in the Baltic Sea significant advantages over alternative routes on land. Source: Interview with Nord Stream Deputy Communications Director, 10 July 2012.
32. Willem J. Timmermans J, 'The Future of Offshore Pipelining', *Offshore Magazine* 62, no. 6 (6 January 2002).
33. UN, 'UNCLOS 1982', 1982, http://un.org.
34. D. G. Gorman and June Neilson, eds., *Decommissioning Offshore Structures* (London; New York: Springer, 1998).
35. Arvid Pardo, 'Speech to the United Nations General Assembly 22nd Session, Official Records.' (United Nations, 11 January 1967), http://un.org.
36. Nancy Couling, 'Legislation of the Sea: Spatializing a New Urban Realm', in *ARCH+ Legislating Architecture* 49 no. 225 (2016): 120–23, http://archplus.net.
37. Rania Ghosn, 'Energy as a Spatial Project', in Ghosn, *New Geographies 2*, 7–10.
38. Mark E. J. Newman, *Networks : An Introduction* (Oxford: Oxford University Press, 2010).
39. Gabriel Dupuy, *Urban Networks – Network Urbanism* (Amsterdam: Techne Press, 2008).
40. Henning Grann, 'Europipe Development Project: Managing a Pipeline Project in a Complex and Sensitive Environment', in *The Industrial Green Game*, ed. Deanna J Richards (Washington DC: National Academy Press, 1997), 154–64, https://nap.edu.
41. Bioconsultant Schuchardt & Scholle, 'Environmental Impact Assessment Europipe II in Germany: Offshore & Onshore Section', Environmental Impact Assessment. Client: Statoil Deutschland (Bremen, July 1998), https://equinor.com.
42. Matthew Whitfield, 'Grimsby Fishdocks – an Assessment of Character and Significance', Historic England Kasbah Report (Great Grimsby Ice Factory Trust, April 2009), http://ggift.co.uk.
43. R.N. Rudmose Brown, 'Holderness and the Humber', in *Great Britain: Essays in Regional Geography,* ed.

Alan G. Ogilvie (Cambridge: Cambridge University Press, 1928), 812–21.

44. Julian Manning, Baker Hughes Process & Pipeline Services, presentation, Offshore Energy Conference, Amsterdam, 10 October 2017.
45. David Harvey, *The Urban Experience* (Oxford: Blackwell, 1989). Neil Brenner, 'Theses on Urbanization', *Public Culture* 25, no. 1 (69) (1 January 2013): 85–114, https://doi.org/10.1215/08992363-1890477.
46. Mason White and Lola Shepherd, 'New New Deal: Infrastructures on Life Support', in *Infrastructure as Architecture : Designing Composite Networks*, ed. Katrina Stoll and Scott Lloyd (Berlin: Jovis, 2010).
47. Maria Kaika and Erik Swyngedouw, 'Fetishizing the Modern City: The Phantasmagoria of Urban Technological Networks', *International Journal of Urban and Regional Research* 24, no. 1 (2000): 120–138, https://doi.org/10.1111/1468-2427.00239.
48. Jeffrey Kipnis and Alexander Maymind, *A Question of Qualities : Essays in Architecture* (Cambridge, MA : MIT Press, 2013), 294.
49. Ibid., 292.
50. Roberto Mangabeira Unger, 'The Better Futures of Architecture', in *Anyone*, ed. Cynthia C. Davidson (New York: Rizzoli, 1991).
51. Ibid., 30.
52. Ibid., 30.
53. Ibid., 35.
54. Kipnis and Maymind, *Question of Qualities,* 294.
55. Harry Gugger, Nancy Couling, and Aurélie Blanchard, eds., *Barents Lessons: Teaching and Research in Architecture* (Zürich: Park Books, 2012).

Biographies

Carola Hein is professor and head of the History of Architecture and Urban Planning Chair at TU Delft. She has published widely in the field of architectural, urban and planning history and has tied historical analysis to contemporary development. She received a Guggenheim Fellowship to pursue research on *The Global Architecture of Oil* and an Alexander von Humboldt fellowship to investigate large-scale urban transformation in Hamburg in an international context between 1842 and 2008. Her current research interests include the transmission of architectural and urban ideas, focusing specifically on port cities and the global architecture of oil. She has curated *Oildam: Rotterdam in the oil era 1862–2016* at Museum Rotterdam. She serves as *IPHS Editor* for *Planning Perspectives* and as Asia book review editor for *Journal of Urban History.* Recent books include *The Routledge Planning History Handbook* (2017) and *Uzō Nishiyama: Reflections on Urban, Regional and National Space* (2017).

Nancy Couling studied architecture at the University of Auckland and completed her PhD on *The Role of Ocean Space in Contemporary Urbanization* at the EPFL (Ecole Polytechnique Fédéral de Lausanne) in 2015. She was founding partner of the interdisciplinary Berlin practice cet-0/cet-01 (1995–2010) and was a teaching assistant in for Prof. Klaus Zillich of TU Berlin. She recently joined the Chair of History of Architecture & Urban Planning, TU Delft, as a Marie Curie Research Fellow with the project OCEANURB – the Unseen Spaces of Extended Organization in the North Sea, 2017–2019, investigating the sea-borne spatial implications of extended urbanization.

Review Article

New Interfaces in the Automated Landscapes of Logistics

Jesse LeCavalier

As a body of knowledge and as an area of work, logistics tends toward the mechanical over the inquisitive – toward the *how* instead of the *why*. In other words, the concerns of the industry typically focus on solving a problem rather than considering whether the problem is a problem at all or, indeed, if it needs solving. Logistics is not alone in this emphasis but since it is an industry dedicated to the management of objects over distance and duration, its operations shape and reshape the built environment and are therefore particularly germane to architecture and urbanism. The transformations that logistics produces are incremental and most apparent at sites of incompatibility, be they physical, legislative, or both. For example, the misalignment of a loading dock height with a tractor-trailer opening creates a small but significant wrinkle in a process always seeking smoothness – a wrinkle that some logistics manager somewhere will try to iron out. Logistics, if we might speak of it in such a way, depends on loose structures and overlapping affinities to navigate these incompatible conditions.[1] The corresponding architectures of logistics become explicit sites for these negotiations and are designed to reduce friction and to enable the rapid distribution of material. They reflect a systems-based approach that emphasises compatibility and nimbleness and might lead us to see logistical installations less as buildings in a conventional sense and more as standardising technologies designed to project a certain version of the world.

Such standardising technologies include not just the physical spaces but also immaterial systems like data management structures. However, even if a realm like data management might be largely understood as non-physical, it nonetheless depends on a material corollary to navigate between the two realms. Much like the way the architectures of logistics can translate between different systems, the bar code functions similarly to translate physical objects into information to be managed. Both building and bar code function as 'loose couplings' to bind multiple realms together. According to Karl Weick, who developed the concept,

> if all of the elements in a large system are loosely coupled to one another, then any one element can adjust to and modify local unique contingency without affecting the whole system. These local adaptations can be swift, relatively economical and substantial.[2]

While seemingly a tool of reduction and over-specification, part of the barcode's power arises from its capacity to adapt to diverse conditions while still creating linkages among ostensibly incompatible worlds.

The barcode is just one of several coupling technologies that facilitate the internal compatibility within logistical systems. Such consistent functionality contributes to an overall internalisation that increasingly characterises logistical environments themselves (i.e. environments *of* logistics rather

than environments *for* logistics). Even if these environments are discontinuous, with multiple types and amounts distributed throughout the landscape, they remain internally consistent and connected. For example, tractor-trailers create a mobile but continuous space, a kind of attenuated continuity, by bridging between warehouses and shopping environments. When confronted with such a condition, Leigh Star's conceptual category of the 'boundary object' helps extend Weick's idea of loose coupling into a more material realm. For Star, boundary objects

> inhabit several intersecting social worlds *and* satisfy the informational requirements of each of them. Boundary objects are objects which are both plastic enough to adapt to local needs and the constraints of several parties employing them, yet robust enough to maintain a common identity across sites.[3]

These elements support multiple associations from multiple groups and are thus sources of coherence and organisation in far flung systems. With these notions in mind, this article explores the emerging landscapes of logistics to better understand how logistics shapes the built environment and to consider some of the potential entry points for design.

The persistent metaphor of flow is often conjured to describe the processes and labour that move material from one place to another. The 'space of flows' that Manuel Castells articulated for us is a important conceptual tool of course, arriving as it did during an expanding understanding of globalisation and its consequences.[4] Logistics emerged as a specialised area of knowledge during this period and is coming to characterise the operations of many of the world's largest commercial corporate actors, including companies like Amazon and Walmart. Propelled by reliable and expanding consumer appetites, the operations of these companies coalesce around logistical priorities, including increasing speed, lowering costs, and externalising their consequences for us, their customers. To do this, those involved in logistics generate both their own ways of being in the world and of knowing the world. These modes are laced with apparent contradictions that illuminate the ambiguities inherent in the industry. [Fig. 1, 2]

For the systems of elements within a logistical system, friction is a constant threat. At the same time, the qualities associated with a healthy urban structure are often the result of friction, both literally and figuratively. Those involved with logistics work to eliminate this friction through 'lubricating' efforts to loosen restrictions, overcome barriers, or to create spaces of exception. One of the key arrays of instruments in this process is familiar to architects – they are the things we call buildings. [Fig. 3]

Logistical buildings proliferate just as logistical companies seek to make the apparatus of their efforts disappear. While these distribution centres and data centres and control centres and continuity centres and risk management centres and shrinkage prevention centres supervise and control vast streams of data, all that seemingly immaterial information often remains physically connected to actual things, each with their own volume and weight and materiality. As a result, decisions made in haste or under duress at a remote workstation can have echoing consequences on the ground, wherever that might be. These could include the real estate processes that automated location software instigates or the miles-long walking circuits of distribution centre workers engaged with the stowing, picking, packing, and shipping of orders.

E-commerce fulfilment targets individual consumers yet relies on collectively funded infrastructure to deliver its orders. At the same time, institutions that were once sites of collective

Fig. 1

Fig. 2

Fig. 3

Fig. 4

Fig. 5

Fig. 1: When they do anything but. Image: UPS roller platform floor. Photo: Dustin Chambers.

Fig. 2: Logistics governs this movement of things through time and space. Source: Uniform Grocery Product Code Council, *UPC Symbol Specification* (Washington, DC, 1973). Courtesy of Bill Selmeier.

Fig. 3: Entire landscapes of logistics have emerged to enable the movement of things. Image: author.

Fig. 4: Fulfilment creates a wilderness of machines. Image: KIVA Robotics by DAWGHAUS Photography (https://bostonglobe.com, accessed July 30, 2018).

Fig. 5: Walmart's logistics origin story depends on architecture. Image: author.

encounter are obviated by the convenience and affordability that a company like Amazon offers.

Fulfilment isolates consuming subjects by rendering us into consumer profile categories based on broad demographic generalisations. However, rather than make space for the difficult questions posted by collective decision-making scenarios, fulfilment industries foreground the capacity for individual impulsive choice, either through an abstract notion of 'self' improvement or through the intensification of impulsive desires mutated from evolutionary survival instincts. By maintaining focus on these more individualised decision realms and by isolating consuming subjects through gestures of personalisation, fulfilment industries claim to free us from confronting either the abstract but shared responsibilities related to, for example, the 'slow violence' of global warming or the collective immediate action required by contemporary crises of government, economy, or environment.[5]

Logistics creates the problem and offers itself as the solution. Operating at the speed demanded (and promised) by companies like Amazon requires vast commitments to technology precisely to escape the physical commitments of location. Indeed, traveling light, as Zygmunt Bauman might phrase it, is not just about a nomadic lack of commitment but is a deeper organising philosophy that seeks to intensify a lack of attachment; a disencumbrance.[6] Such imperatives contribute to subtle but significant spatial and material transformations including, for example, the slow erosion of architectural boundaries.

With its acquisition of Kiva Systems in 2012, Amazon took a major step toward the eventual displacement of architecture as both human-centred discipline and as static assembly. These systems require only the most minimal of enclosures to create a stable interior climate and flat floor that allow machines to travel easily. Governed by algorithms but apparently acting with their own intentionality, the small robotic drive units (RDUs) appear quietly from the dark of the centre's depths, present their charge and then glide away, only this time to a location different from their origin.

Multiply this path, this linear gesture, this apparent behaviour, by millions. Then imagine that it never stops.

While the scripts controlling these fulfilment circuits are authored by people, the effect on the ground is inscrutable and unpredictable. The RDUs' collective activities politely tolerate the humans among them by patiently waiting for them to finish their work or by quietly waiting for them to get out of the way so that they might be able to get back to the task at hand. To witness this in action is to see a species not yet taught to fear or adapt to human presence. The robots' indifference to the organic lumps that share their space creates its own kind of wilderness, one whose logic remains unavailable to us. [Fig. 4]

The global retail corporation, Walmart, was a pioneer in developing the logistical environment. The company began as a regional discount retailer in 1962 and has since grown into the world's largest revenue generator, earning almost $486 billion in 2017. The closest global rival was China's national power company, State Grid, with $315 billion and in the US, the conglomerate holding company Berkshire Hathaway with $223 billion. While Walmart seems most concerned with Amazon's ascendance, the Seattle-based internet services and retailing company remains a distant twelfth in the ranks, pulling in just under $136 billion in FY2017. In terms of profit margin, Walmart was at 2.8 percent for 2017 and Amazon at 1.7 percent. However, while Walmart's profits shrank by 7.2 percent, Amazon's increased by almost 300 percent. Both of these companies are embedded in the social fabric of the United States and, increasingly, in the urban fabric as well. Both depend on an assumption of the

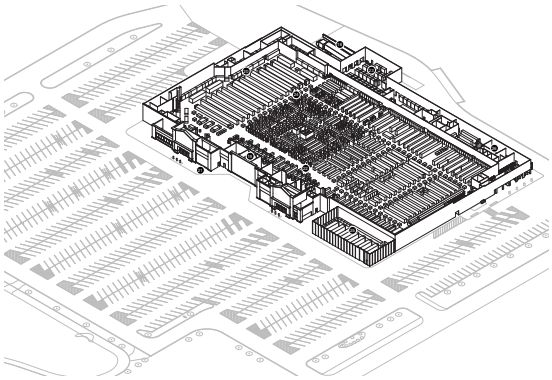


Fig. 6a

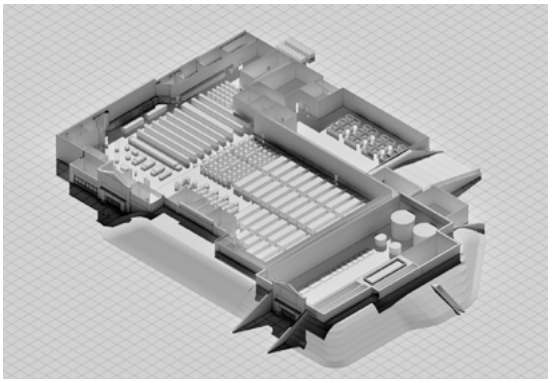


Fig. 7a

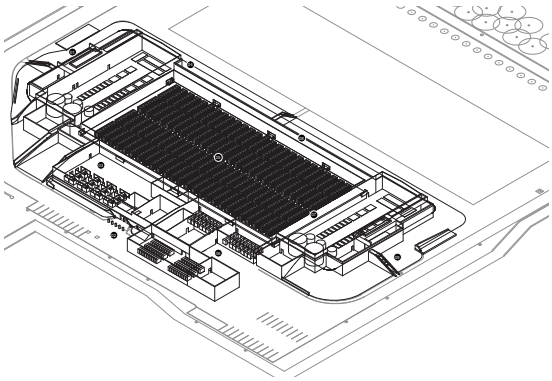


Fig. 6b

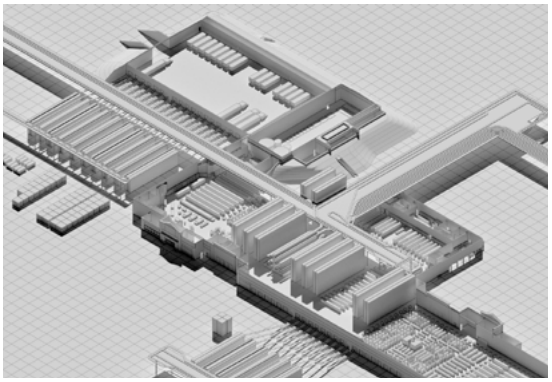


Fig. 7b

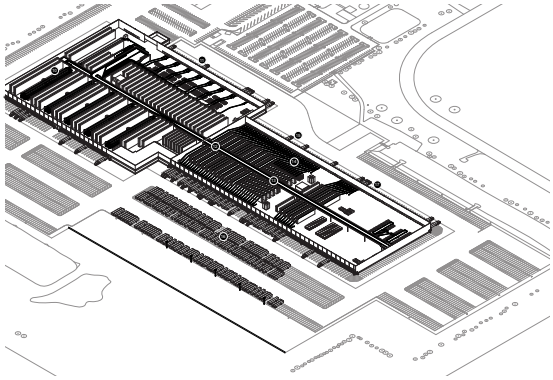


Fig. 6c

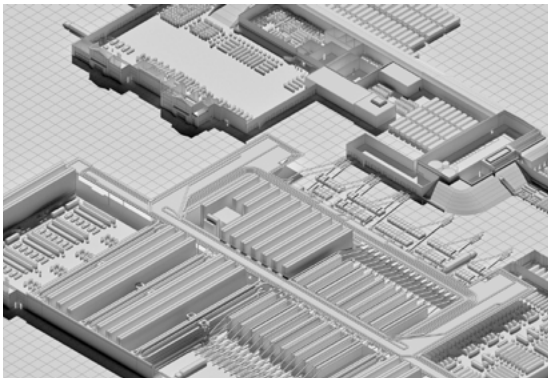


Fig. 7c

Fig. 6a: The Supercentre has content but no form. Image: author.

Fig. 6b: The Data Centre has form but no content. Image: author.

Fig. 6c. The Distribution Centre's content is the form. Image: author.

Fig. 7a: DataXpress combines multiple forms of consumption. Image: author.

Fig. 7b: ConDoIt merges passenger and inventory flow. Image: author.

Fig. 7c: Bldg2Bldg interface enables automatic materials exchange. Image: author.

stability of a consumer class that seeks to maximise utility of its spending by 'saving' money on less expensive goods. While Amazon's model demands remote storage and digital interfaces (so that it might plausibly present itself as a store that sells 'everything'), Walmart primarily presents its inventory in its collection of physical stores, nearly eleven thousand of them worldwide. [Fig. 6a]

Walmart relies on three building types: the discount retail centre, the data centre, and the distribution centre. (Figure 8a, 8b, 8c) Walmart calls its retail centres that sell dry goods and groceries 'Supercenters.' They are the most common Walmart building, with three and a half thousand in the United States alone. The company controls the interior layout of the stores so that they remain compatible within their larger logistics system. However, the building uses a buffer zone to mediate the unexpected differences of individual sites. While the interior content is rigidly determined by merchandise forecasting and replenishment protocols, the exterior form is somewhat more malleable. [Fig. 6a]

Walmart has its own data centre that it uses to store information and manage orders. The building consists of a large server warehouse whose perimeter is defined by a tall earthen embankment. While this earthwork creates a stable form, the contents of the building are constantly updated as new technologies are adopted. In this sense, the building is more of an infrastructural processing device with stable perimeter but with a fluid interior. [Fig. 6b]

Distribution centres process Walmart's inventory on its way from suppliers to retail outlets. Buildings like this one are semi-automated switching facilities that rarely contain inventory for more than twenty-four hours. Conventional architectural enclosure is the most expedient way of protecting and securing the processing machinery inside and thus the envelope adheres tightly to the contents. Thus to speak of distribution centres as buildings is to not register their embeddedness within the larger logistical landscape. [Fig. 6c]

Next to this stable collection of building types, the company continues to experiment with new formats, including convenience stores, petrol stations, and other smaller faster formats. With these experimental formats as precedents and as evidence that the retailer continues to seek out new possibilities for its collection of built elements, the following formats are speculative extensions and recombinations of the retailer's base genetic material.

Walmart's need to keep growing makes its logistical mission increasingly critical, especially as Amazon appears more and more likely to overtake the older company. To compete with the online retailer, Walmart has increased its own online presence through, among other things, the acquisition of Jet.com and Flipkart, both large e-commerce companies. These shifts point to an increased need for data management and distribution, especially in and for urban areas.

DataXpress formats provide convenient local access to cloud storage. Sharing space with a food centre, the building type maintains a low profile as it is partially embedded in the earth. Huggers and tenders are on staff to help with questions about data growth. [Fig. 7a]

At the same time, because of its actual stores, Walmart has physical distribution points throughout the country with more than half of its stores within five hundred metres of a city boundary.[7] To support increased automated mobility, ConDoIt fuses transit hub modality with distribution centre responsiveness, piggybacking outgoing transit lines to consolidate Preferred orders, helping to avoid empty back-hauls while maximising customer product exposure. [Fig. 7b]

Fig. 8: Automated reorganization of building elements produces plausible logistical configurations. Image: ‘The End of Buildings’, Jesse LeCavalier, Seoul Biennale for Architecture and Urbanism, 2017.

The automated environments of advanced distribution demand expedited exchange and delivery of material across facilities. Rather than using tractors, systems can plug directly into adjacent or related fulfilment zones, translating to less downtime, less hurry-up-and-wait, and greater throughput. [Fig. 7c]

The images included here are the results of a project that perpetually reshuffles pieces of Walmart's distribution system to examine their compatibility but also to investigate the spatial arrangements that emerge from their recombination. On one hand, the technical information and the axonometric projection provide credible alibis for apparently absurd building configurations. At the same time, the buildings are not randomly generated but rather identified from patterns that emerge from the cycling combinations of elements. In this sense, the heuristic dimension of pattern recognition introduces some level of subjectivity to an otherwise autonomous process while also simulating the growth of the logistical landscape. [Fig. 8]

Recurring combinations present evidence, not so much of a single configuration but more like a recurring probability – something that tends to 'stick' over time. These sticky patterns suggest emergent logistical environments, freed from assumptions about use, type, or even inhabitation. The logics of standardisation, which are necessary for the function of logistical systems, support this compatibility. Drawing out the absurdity in the process introduces some kind of contaminant into an increasingly sterile formula or a retardant into an increasingly accelerated process. The automatic production of new logistical forms intensifies these inherent processes to generate plausible but unstable images. By creating representations of logistical environments and by subsequently attempting to read them, we not only recognise our own general illiteracy but also see aesthetic possibilities beyond the utilitarian. The logistical 'boundary' increasingly emerges as a site of design investigation even as it becomes more self-referential. To create the frictionless conditions that logistics promises and seeks, it is possible that the contemporary 'loose' relationships of elements might very well be only an intermediate step along a path to a much more tightly organised, and therefore inaccessible, logistical world.

Notes

1. Langdon Winner addresses the challenges of reification when engaging such phenomena. He writes, 'The charge of reification, however, loses some of its impact if one considers that social science consistently reifies concepts such as "society", "family", and "bureaucracy". One is hard pressed to think how it could do otherwise. Since we cannot have all that we wish to talk about immediately present as empirical referents, we must employ symbols to represent phenomena.' Langdon Winner, *Autonomous Technology: Technics-out-of-Control as a Theme in Political Thought* (Cambridge, MA: MIT Press, 1977), 42.
2. Karl Weick, 'Educational Organizations as Loosely Coupled Systems,' *Administrative Science Quarterly* 21, no. 1 (March 1976): 7.
3. Susan Leigh Star and James R. Griesemer, 'Institutional Ecology, "Translations" and Boundary Objects: Amateurs and Professionals in Berkeley's Museum of Vertebrate Zoology, 1907–39,' *Social Studies of Science*, 9, no. 3 (August 1989): 393.
4. See, for example, Andrew Ballantyne and Chris L. Smith, eds., *Architecture in the Space of Flows* (London: Routledge, 2012). The volume contains a series of articles, each concerning some aspect of 'flow' in contemporary space, e.g. 'Oceanic Spaces of Flow,' 'Trade Flow: Architectures of Informal Markets,' 'Temporal Flows,' 'Navigating Flow,' etc.
5. See for example, Rob Nixon, *Slow Violence and the Environmentalism of the Poor* (Cambridge MA: Harvard University Press, 2013).
6. Zygmunt Bauman, in *Liquid Modernity*, points to 'travelling light' as an asset of power because 'holding to

the ground is not that important if the ground can be reached and abandoned at whim.' Zygmunt Bauman, *Liquid Modernity* (Cambridge: Polity Press, 2000), 13.

7. Matthew Zook and Mark Graham, 'Wal-Mart Nation: Mapping the Reach of a Retail Colossus,' in *Wal-Mart World: The World's Biggest Corporation in the Global Economy*, ed. Stanley D. Brunn, (London: Routledge, 2006), 20.

Biography

Jesse LeCavalier's work explores the architectural and urban implications of contemporary logistics. He is the author of *The Rule of Logistics: Walmart and the Architecture of Fulfillment* (University of Minnesota Press, 2016) and an associate professor of architecture at the New Jersey Institute of Technology. He is currently the Daniel Rose Visiting Assistant Professor at the Yale School of Architecture. LeCavalier was the recipient of the 2015 New Faculty Teaching Award from the Association of the Collegiate Schools of Architecture (ACSA) and the 2010–11 Sanders Fellow at the University of Michigan. His work has appeared in *Cabinet*, *Public Culture*, *Places*, *Art Papers*, and *Harvard Design Magazine*. His installation 'Architectures of Fulfillment' was part of the 2017 Seoul Biennale for Architecture and Urbanism as his project 'Shelf Life' was one of five finalists for the 2018 MoMA PS1 Young Architects Program.

Review Article

The Other California

Neeraj Bhatia

The Other California

In 2018, a group led by Robert Paul Preston and Tom Reed released their *New California* proposal to consolidate the rural hinterlands of California into a separate and distinct economy from the coastal and urban cities. The *New California* plan is strikingly similar to the 2016 *Six Californias* plan – a proposal by venture capitalist Tim Draper to split the state into distinct geographic and economic zones. Critics of the plan stated that the proposal's intention was to draw lines between economically rich and poor zones of the state and form segregated enclaves.[1] While the *Six Californias* plan failed to qualify as a California ballot measure, a likely fate for the *New California* plan as well, the re-emergence of such plans point to the fact that in California, there are highly regionalised politics, economics, and cultures. Within the state, the greatest political, economic, and cultural divide manifests itself between California's coastline and the inland Central Valley. Coastal California portrays an image of scenic landscape, progressive environmental movements, liberal culture, and density, while inland California is characterised by resource harvesting and extraction, their associated infrastructures, as well as by-products. What these plans tend to ignore is the interdependent relationships between these zones, enabled by logistical infrastructures, and characteristic of understanding capitalism as a form of world ecology. Separated by topography, wealth, race, climate, and pollution, these two Californias are emblematic of the increasing divide between the realities of resource consumption and the exploitation of land and communities to extract these resources.

We could say that the simultaneous division and interdependence between 'cultures of extraction' and 'cultures of consumption' are tied to the structural arrangement of historical capitalism, which required continual expansion both horizontally – across the landscape – and vertically – into the earth, for resources. These forms of expansion were contingent on what Marx referred to as the 'free gifts of nature' – exploiting and commodifying the unpaid work of nature.[2] More recently, Jason W. Moore has expanded Marx's notion through his concept of 'cheap natures'. Moore's cheap natures are found where one or more of the 'four cheaps' exists—labour, energy, food, or raw material.[3] According to Moore, growth and accumulation in capitalism requires the continual search for the 'four cheaps'. It is at this site where the frontier of capitalism resides through the commodification of uncommodified natures.[4] While the frontier of capital locates itself in many diverse areas of the planet – from sweatshops in Mexico to burning cheap coal in China – they are always territorialised by the spatial formats of logistical infrastructure.

Nowhere is Moore's concept of cheap natures more evident than in the flat desert landscape of inland California, known as the Central Valley. Driving through this region today, one is confronted

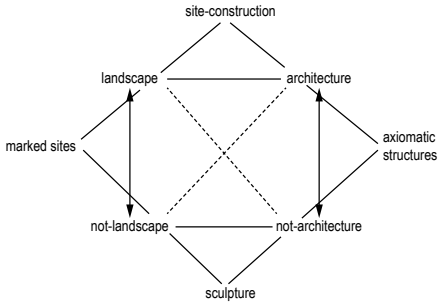
with a comprehensively operationalised landscape to sustain both the state and country's resource needs. The 'four cheaps' are so prevalent and pervasive in the Central Valley that it continues to be profitable to invest in massive infrastructures to import water to the valley (one natural resource that the area is in fact lacking) to cultivate crops and extract petroleum or shale resources. Situated between the Coastal and Sierra Nevada Mountains, this once difficult-to-access desert landscape is now globally networked through mega-infrastructural projects that connect to a vastly different California hundreds of miles away, each benefiting from the unpaid work of the Valley's nature.

Examining the spatial structure of this vast operationalised landscape, we witness specific spatial formats of logistics that have been used to territorialise the land – namely, surfaces, containers, and conduits.[5] Akin to how Rosalind Krauss positioned and qualified sculpture practices in her essay 'Sculpture and the Expanded Field' some forty years ago, the infrastructure of logistics could be qualified in an expanded field of design today.[6] Using a Klein group diagram, Krauss identified three sub-practices of sculpture that had previously been buried within a generalisation of sculpture. She qualifies them as 'site-construction', 'marked sites', and 'axiomatic structures'. In a similar effort, infrastructure's expanded field exists between urbanism and landscape, and yields sub-formats of surfaces, containers and conduits. [Fig. 1] These formats have colonised vast swathes of hinterland environments, and operate at a scale closely aligned to global and regional logistics. 'Surfaces' are planes of mediation that typically function at a territorial scale as they are primarily implicated in a form of harvesting or collection. 'Containers' are architectural shells of enclosure often sited between the formats of surfaces and conduits – for storing, refining, or distributing a particular good. 'Conduits' are used to transfer matter and energy across vast distances, cutting through local settlements, political boundaries, ecosystems, and connecting to both containers and surfaces. These spatial formats typically reside in the 'background' of spatial design, yet are increasingly organising large tracts of land both in the hinterland as well as on the periphery of cities. Engaging in these background logistical formats holds promise for designers to have agency over territorial arrangements and could potentially offer alternate organisations that repay nature for its unpaid work. The following essay attempts to define, through photographs and text, how these formats operate. [Fig. 2]

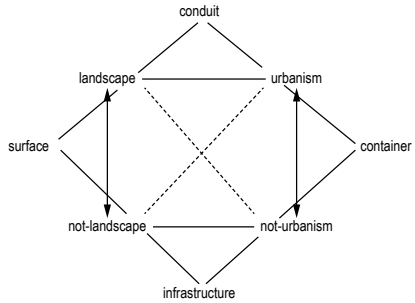
Surfaces

The surface has become the primary organisational format of contemporary urbanism. Deployed for harvesting and collection – agriculture, energy, water – the surface is predicated on scale and thereby often situated where land is cheap. While this condition is witnessed in accumulation scenarios for global scaled consumption, the project of the surface is also found in a variety of environments from sprawling suburban decentralised cities, such as Houston or Atlanta, to managerial environments such as airports and distribution centres.[7] Consider the influence of the surface even at the building scale. From Mies's free plan to SANAA's Rolex Centre, the surface enables a flexible system that is not limited by traditional architectural elements such as walls, but rather more adjustable formats of furniture and objects. The nimbleness and flexibility the surface allows for different forms of managing matter through time.[8]

While the surface can exist at several scales, its territorial scale is highly integrated into the front end of a logistical chain – where raw materials are harvested and gathered. In this manner, the surface is the most geographically specific of the three formats. Consider, for instance, agricultural fields, which are more robust within certain solar and soil



Sculpture in the Expanded Field, Rosalind Krauss, 1979



Infrastructure in the Expanded Field, InfraNet Lab, 2009

Fig. 1

Fig. 2

Fig. 1: Infrastructure in the expanded field – Klein Group Diagram. Image courtesy of InfraNet Lab.

Fig. 2: Logistic distribution centre under construction emerges along Interstate 205 outside of Stockton. As one moves away from the conduit, surface agriculture coats the land. Photo: author.

Fig. 3

Fig. 4

Fig. 5

Fig. 6

Fig. 3: Agricultural lands in the Central Valley take advantage of the geologic history that produced both flatness and nutrient rich soils. Growing more than 230 crops, the Central Valley produces approximately eight percent of the agricultural output by value in the United States. Photo: author.

Fig. 4: Windmills arrayed along the Altamont Pass landscape operationalise topographic and atmospheric shifts into energy. Photo: author.

Fig. 5: The Kern River Oil Field, just outside of Bakersfield, is the third largest oil field in California and fifth largest in the United States. Pumpjacks are distributed across the landscape to extract organic matter from this once inland lake. Photo: author.

Fig. 6: California Aquaduct (foreground) distributes water from Northern California to Southern California for agriculture, fracking, and human consumption. Interstate 5 (background) connects across the valley landscape and is the main

Fig. 7

Fig. 8

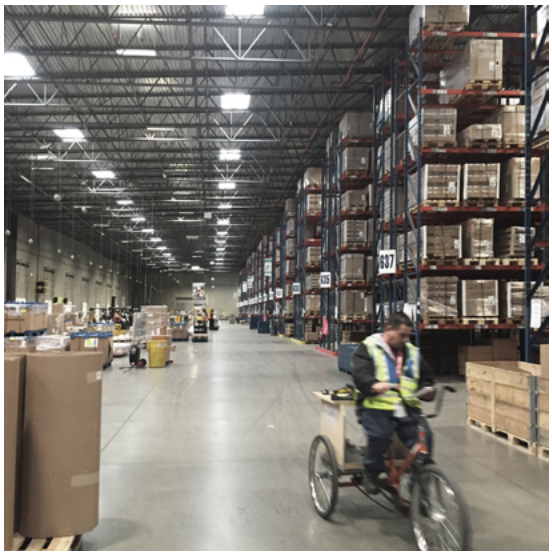


Fig. 9

Fig. 10

artery for truck transport across the state. Photo: author.

Fig. 7: Running along Interstate 5, this canal is part of the Central Valley Project – a federal water management project – devised in 1933 to transport water from Northern California to Southern California. Photo: author.

Fig. 8: Crude oil pipelines in the North Belridge Oil Field in South-Central California. Photo: author.

Fig. 9: Interior of the IKEA distribution centre in Tejon Ranch is reminiscent of a city – shelving blocks, streets, and alternate modes of transport. The 15,886m^2 distribution facility serves all IKEA retail stores in the Western United States. Photo: author.

Fig. 10: 'Almost-Architecture' of the container – in its most dematerialised form, the container is reduced to a form of clothing. Shown here, plastic sheets draped over manure are ballasted with rubber tires, which fuse into a thickened skin. Photo: author.

conditions and are often situated in key zones of a watershed. [Fig. 3] The environmental inputs in the surface thus set up a field of opportunity for particular forms of harvesting. In this way, the surface is not necessarily a plane but a field of harvesting or gathering distributed over a vast area. For example, an array of windmills are often sited in geographically specific zones of air and temperature exchange to capitalise on greater wind velocities. The windmill itself is not a surface, but rather a component in a distributed set of points that are harvesting from an atmospheric surface. [Fig. 4] Similarly, a field of oil pump-jacks collectively tap into a geologic surface below grade. [Fig. 5] In both cases, the surface tends towards decentralisation and diffusion – key characteristics of a soft system. This is to say that failure of any of these points does not result in catastrophe, as the surface relies on modest quantities distributed over a region. Failure in a surface is often the result of widespread environmental transformations (for instance, persistent drought in agricultural areas) or exhausting a finite resource (such as depleting an aquifer or oil basin). As the scale of logistical integration increases, so does the scale of the surface. Simply put, more people benefiting from the products of the surface not only requires a larger surface but also more infrastructures to connect these surfaces into larger logistical system. The Italian group Superstudio depicted the growing scale of a continuous artificial surface in their speculative project *Supersurface 5* during the 1960s. Organised through an endless grid to enable the flow of energy, matter, and information, the proposal acknowledged the contemporary capacity for the surface to gather matter and connect the world globally into an integrated system.

Similar to *Supersurface 5*, the Central Valley is a vast surface that is integrated by a vast network of conduits. Within this landscape, the environmental inputs partially determine how land is organised *vis-a-vis* agriculture and energy (oil, wind, and solar). The scale of extraction and harvesting goes beyond local needs – these surfaces produce nearly half of the United States' fruits, vegetables, and nuts while leading the nation in milk production, with over 1.75 million dairy cows. For the past fifty years, California has been the top agricultural state of America. Furthermore, there are currently approximately eighty-four thousand active and new oil and gas wells in California, most of which are located in Central Valley, making California one of the larger domestic oil players. Given the scale of production, large conduits and containers have been strategically located to distribute and stage these products.

Conduits

Conduits are used to transfer matter and energy across vast distances, cutting through local settlements, political boundaries, ecosystems, and connecting to both containers and surfaces. [Fig. 6] They are often accompanied by easements – zones around the conduit that are cleared to neutralise and tame the varied conditions that are to be navigated. The easement becomes the primary corridor for access, communication, maintenance, surveillance, and construction of the conduit. Moreover, compared to the conduit itself, the easement creates perhaps the most permanent condition of all – these zones are often deemed their own political-economic jurisdiction (such as a free-trade zone or zone with differing legislative requirements), a designation that attracts other infrastructures and activities that solidify particular characteristics within this vector. Conduits have a particular significance in logistical systems as they allow for the spatial separation between extraction, processing, manufacturing, and consumption. Forming a physical network across the globe, conduits ensure access to resources that are spatially remote – making them one of the primary technological artefacts for capitalist expansion and consumption. While the endlessness of the surface is incomprehensible to the human scale, the conduit

Fig. 11: ‘Almost-architecture’ of the container – reduced to a large roof span to provide weather protection for agricultural products. Photo: author.

as a type is tasked with interfacing between the scale of the territory and that of architecture.

The integration between systems and geographies enabled by the conduit allows for the processing and manufacturing of goods to tap into cheaper labour markets that are often geographically removed from front-end logistics. More importantly, the conduit is a critical invention for making our resources an abstract commodity by separating sites of extraction from those of consumption, allowing amongst other things, the environmental costs of extraction to be highly removed – allowing those who benefit from these resources to not have to confront the consequences of its extraction.[9] These consequences range from environmental contamination to inequitable labour practices to the production of urban residue once resources are depleted. The abstraction fostered by spatial detachment has characterised the conduit as a dissociated technology.[10]

The Central Valley was once a difficult-to-access landscape, which in the last century has been networked with highways, train lines, aqueducts, pipelines, and hydroelectric corridors. [Fig. 7] On the one hand, these networks have been used to provide scarce inputs; for instance, a series of aqueducts that move water from Northern California to the southern part of the state for fracking, agriculture and general consumption. The primary functions of the conduit, however, are downstream of the supply chain – creating zones of specialised manufacturing or refining and distribution or storage. While some conduits, such as pipelines, move through the landscape almost invisibly, conduits of human movement (rail, highways, and so on) tend to attract linear forms of urbanisation. [Fig. 8] Today, the Central Valley is the focus of a large-scaled high-speed rail project that will connect Los Angeles and San Francisco and move millions of people through this once background landscape.

Containers

Containers are large shells of enclosure primarily used for storage and staging of materials. As such, they are always directly linked to conduits and in some cases surfaces, where the storage of harvested materials is required on site. In cases where the container is connected solely by conduits, it is usually sited within lands that are cheap yet in close proximity to urban centres to have access to labour and the eventual market.

Containers are perhaps the most non-expressive form of architecture – their low horizontal exterior profile is typically punctuated by a consistent pattern of openings that enables mobile shipping containers (often on trucks) to plug into and expand their structure. Their almost infinite interiors are reduced to their basic infrastructures (structure, lighting, and HVAC) to allow for ultimate flexibility. In this sense, the container is an infrastructure and enclosure for a surface project that operates at an architectural scale. This surface is organised as a micro-city whose logic of streets (trafficked by bikes, rickshaws, Segways and forklifts) and 'blocks' (of storage shelving) are the result of flow patterns and technologies such as the forklift. [Fig. 9] Architecture is reduced to a thin veil that separates the interior from exterior – yet both sides of this threshold are organised by similar systems of urbanisation, albeit at radically different scales. This positions the container as both a type of urbanism and non-urbanism.

The container was foreshadowed most insightfully by Archizoom's *No-Stop City*, as a resultant form of the functionalist capitalist city. As *No-Stop City* envisaged, within the infinite scale of the interior, the flux of staging and storing materials is tied to the dynamic qualities of the market and is accommodated through the soft reconfiguration of the interior.[11] As a statement on the flexibility of the interior and the inflexibility of architecture, the

container reduces architecture to its elemental state of weather enclosure. How permanent and formalised this enclosure is, however, depends largely on the durability of the materials in question. In some cases forms of 'almost-architectures' appear to store materials for brief periods. [Fig. 10, 11]

In the Central Valley, the largest aggregation of containers occurs at the intersection of Interstate 5 and Highway 99, a region known as Tejon Ranch Commerce Centre. About an hour north of Los Angeles, the twenty million square foot complex can reach more than forty million people with next day deliver and seventy million within two days.[12] It also is part of Kern County's economic incentive program, which reduces taxes for companies, and many sites belonging to the complex are eligible for foreign trade zone benefits, making it akin to a dry port. Across this landscape, distribution and logistics centres for IKEA, Caterpillar, Famous Footwear, and Dollar General among others, have created a new form of urbanism whose primary unit is the architectural container and is aggregrated around territorial flows.

The Other California

The other California remains in the background yet produces the economic engine that drives the state. New highspeed rail infrastructure through this landscape will undoubtedly trigger new forms of urbanisation that increase land costs and make this landscape more visible. Still, this flat terrain is opportune for harvesting, processing, moving, and staging resources. By understanding these new spatial formats of logistics, we can ask what it means to operate in the background. While the inclination of the architectural discipline while operating in the background tends towards aestheticisation, these spatial formats are indifferent to aesthetics. They employ form and are organised in purely functionalist terms. To engage their logic requires designers to consider the systems at play and how these might be rewired to create more equitable landscapes. Despite this overview focusing on the physical form of these logistical formats, their underlying economic and political protocols are arguably as influential to their development and critical tools for rewiring.

The landscapes of the Central Valley are both unique and not unique. They are unique in what they harvest, and the specific means of storing these materials. They are also not unique in that they are organised by spatial protocols that evaluate land, labour, and markets and reframe spatial zones of opportunity to render goods cheaply. These relational logics between the surface, conduit, and container as well as the sub-formats themselves are rich grounds to consider alternative forms of urbanism. The other California resembles 'other' landscapes throughout the world that are increasingly organised based on global flows of resources and products. They are other because despite their scale and the shear amount of land they consume and organise, they are not integrated into a social, cultural, or design discourse. If Moore's frontier is territorialised through these formats, can these same formats be used to benefit the typically silent subjects of capitalism?

Notes

1. For instance, in a report prepared by the California Legislative Analyst's Office, the state of Silicon Valley would have the United States' highest per capita personal income, while the state of Central California would have the nation's lowest per capita personal income. See: California Legislative Analyst's Office, 'Six Californias Plan: Report', 31 January 2014, http://lao.ca.gov.
2. Karl Marx, *Capital: A Critique of Political Economy,* Vol. 3, trans. Samuel Moore and Edward Aveling, (New York: International Publishers New World Paperback, 1967 [1847]), 745.
3. Jason W. Moore, *Ecology and the Accumulation of Capital* (New York: Verso, 2014).

4. Jason W. Moore, 'The End of Cheap Nature, or: How I learned to Stop Worrying about "the" Environment and Love the Crisis of Capitalism', in *Structures of the World Political Economy and the Future of Global Conflict and Cooperation*, ed. C. Suter and C. Chase-Dunn (Berlin: LIT, 2014), 288.
5. Neeraj Bhatia et al., *Pamphlet Architecture 30: Coupling* (New York, Princeton Architectural Press, 2011), 8.
6. Rosalind Krauss, 'Sculpture in the Expanded Field," *October* 8 (Spring 1979): 30–44.
7. Alan Berger, *Drosscape: Wasting Land in Urban America* (New York: Princeton Architectural Press, 2007), 26–7.
8. Alex Wall, 'Programming the Urban Surface', in *Recovering Landscape: Essays in Contemporary Landscape Architecture,* ed. James Corner (New York: Princeton Architectural Press, 1999), 233–49.
9. Christopher F. Jones, *Routes of Power* (Cambridge: Harvard University Press, 2014), 143.
10. Ibid., 143–4.
11. Andrea Branzi, 'PostFace' in *No-Stop City*, ed. Andrea Branzi and Archizoom Associati (Orléans: HYX, 2006), 151–2.
12. Tejon Ranch Commerce Center, 2018, http://tejon-commerce.com.

Biography

Neeraj Bhatia is a licensed architect and urban designer from Toronto, Canada. His work resides at the intersection of politics, infrastructure, and urbanism. He is an Associate Professor at the California College of the Arts where he also directs the urbanism research lab, The Urban Works Agency. Bhatia has previously held teaching positions at Cornell University, Rice University, the University of Toronto, and is the 2018 Esherick Professor at UC Berkeley. Neeraj is also founder of The Open Workshop, a transcalar design-research office examining the negotiation between architecture and its territorial environment. He is co-editor of the books *Bracket [Takes Action], The Petropolis of Tomorrow*, *Bracket [Goes Soft]*, *Arium: Weather + Architecture*, and co-author of *Pamphlet Architecture 30: Coupling – Strategies for Infrastructural Opportunism*.

Review Article

Twenty-four Hours at Work: A Filmic Survey of Transportation Corridors in Europe

Alex Retegan and Renzo Sgolacchia

The deregulation policies implemented in the United States and the European Union in the early 1980s brought forth a significant rise in employment in the field of logistics, but at the same time, they contributed to the deterioration of work conditions in the industry – a paradoxical situation, largely invisible in the age of online shopping. In recent years, a number of cinematographers showed interest in this type of work, depicting it in documentaries like *Forgotten Space* (Noël Burch and Allan Sekula, 2010), *Boatmen* (Dirk Rijneke, 2012*), A Modern Odyssey* (Davide Monteleone, 2012), *Exotica, Erotica, Etc.* (Evangelia Kranioti, 2015), *The Weight of Dreams* (Francesco Mattuzzi, 2016), *Freightened: The Real Price of Shipping* (Denis Delestrac, 2016) and *Watna* (Lorenzo Casali, Micol Roubini, 2018). While clearly not a direct form of experiencing someone else's work, the documentary offers a way of exploring the complexity of an activity that might otherwise pass unobserved since it doesn't happen in an assigned space and according to an established schedule. Referring to one of these films, *The Weight of Dreams*, this review analyses the implications of the deregulation policies over work conditions, focusing on the relation between workers and space.

The Weight of Dreams is the result of five years of field research conducted by director Francesco Mattuzzi who started with the intention of mapping the road freight transport that supports consumption in Europe. Francesco Mattuzzi discovered an entire 'itinerant city' populated by five million truck drivers.[1] In the end, he selected the case of two drivers, husband and wife, who share the same truck – perhaps an exception, but at the same time, an extreme response to the ever-increasing demands for efficiency in the field of logistics. The film is more than a portrayal of work in logistics; it gives an insight into a lifestyle constantly on the move, yet confined to the limits of a minimal space. [Fig. 1]

The days of the fat contract are over[2]

The lifestyle depicted in the film reflects a situation that has its roots in the process of removing and reducing regulations in the transportation industry starting in the United States at the end of the 1970s. In his book *Il posto dei calzini* (The place for the socks)*,* Swiss economist Christian Marazzi stresses that transportation is the economic sector that best embodies the logic of the deregulation policies of just-in-time production. In his view, this was achieved through measures such as the development of a network of companies external to production, the maximisation of working time in order to reduce initial investments, and the recruitment of flexible labour power.[3] He points out the effects of the shift towards a more flexible production by comparing the consequences of two strikes that took place in 1979[4] and 1994 respectively, both organised by the International Brotherhood of Teamsters (IBT) in the United States. In April 1979, after an unexpected collapse in negotiations over a new three-year contract, three hundred thousand truck drivers went on strike – roughly

90 percent of the IBT's members – paralysing the entire economy of the country. Conversely, the strike in 1994 involved only seventy-five thousand workers (15 percent of the IBT's members) causing no major interruptions in the delivery of goods.[5] 'The company had selected alternative carriers as backups for the small percentage of our carriers who are Teamsters', revealed a Walmart spokeswoman when asked how the 1994 strike affected the company.[6]

The 1979 strike coincided with the beginning of the end for the regulatory period in the history of the trucking industry in the United States. Alfred E. Kahn, the 'father of deregulation' and chairman of the Council on Wage and Price Stability, convinced President Jimmy Carter that giving in to the Teamsters' demands would affect the anti-inflation programme the administration had initiated at the beginning of 1978 to fight against the effects of the 1973 oil crisis.[7] 'Within the course of a year, I expect definite movement toward deregulation of trucking and more thorough deregulation of the railroads', prophesied Kahn at the American Executive Institute.[8] In 1980, President Carter signed the Motor Carrier Act, largely lifting restrictions on entering the market, setting rates, deciding what goods can be transported and what routes must be followed.[9] As expected, the price of packaged consumer goods dropped. But this came at the expense of the employees in the trucking industry. Only five years after the Motor Carrier Act, the number of unionised truckers had halved from approximately 60 percent of the total trucking force in the late 1970s to 28 percent in 1985 as a result of the increasing number of non-unionised carriers registered with the Interstate Commerce Commission.[10] This translated in diminished bargaining power, which subsequently meant lower wages for employees in the entire industry. Between 1978 and 1990, unionised workers' wages dropped by 28.6 percent while non-unionised workers saw their pay cut by as much as 50 percent.[11]

In the European Union, the deregulation of the transportation sector happened later than in the United States and more gradually. The first step was taken by the Council of Transport Ministers which decided, on 14 November 1985, to establish a free transportation market by 1992. Free cabotage, however, was only reached in 1998. As a consequence, road transportation became cheaper, coming to be the most efficient form of transportation in the European Union (approximately three-quarters of freight is transported by truck). Similar to the United States, this entailed lower wages and more precarious working conditions for employees.[12]

In the contemporary globalised and liberalised European transportation market where the unions' voices have significantly quieted down, the employee is much more vulnerable. That is the picture that Francesco Mattuzzi sketches in *The Weight of Dreams*. The two protagonists, Alfredo and Latifa, switch from one trucking company to another in search of an employer who doesn't demand impossible working hours and offers a decent salary. Unlike the days when union leaders sat firmly at the negotiating table with their employers, the two negotiate their conditions over the phone, during working hours and without the mediation of a third party, from a clearly unequal position.

Life in four square meters

For most of its part, *The Weight of Dreams* is set in the cabin of the truck that Alfredo and Latifa drive. In fact, several truck cabins feature in the film, but this is hardly noticeable since the standardised design leaves little room for variation. The two drive a type of truck called a cab-over, where the driver's seat is located over the engine, resulting in a vertical front. This configuration became ubiquitous in Europe as a result of European Union regulations on truck length and weight, introduced so that no operator benefits from undue advantages over competitors from other member states. Within the limited truck length imposed by Directive 96/53, the cab-over

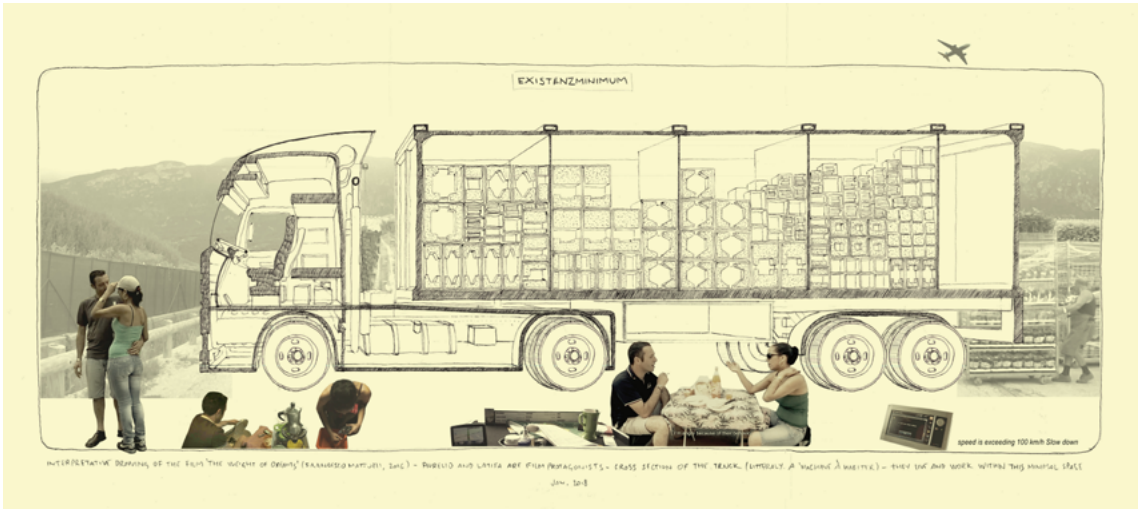


Fig. 1

Fig. 2

Fig. 3

Fig. 4a

Fig. 4b

Fig. 1: The truck cabin is an all-in-one living room, bedroom, kitchen and bathroom, while the parking lot serves a place for recreation and socialising. Collage *Existenzminimum* by Alex Retegan and Renzo Sgolacchia.

Fig. 2–4: *The Weight of Dreams* (Francesco Mattuzzi, 2016), digital frames. Courtesy of the director.

truck allows for more stock than the long-nose truck, where the driver sits behind the engine – a type especially popular in the United States, which regulates only the length of the trailer. Due to the demand to maximise stock, the design of cab-over truck aimed at reducing the dimensions of the cabin as much as possible. As a result, most cabins in Europe measure 2.35 metres in length, enough to fit a sleeper berth of approximately eighty by two hundred centimetres. In this space that barely accommodates one person, the film's two protagonists often share the bed.

To understand the two drivers' routine, the director recorded hundreds of hours of footage, at first accompanying them during their journeys and later leaving them the camera with clear instructions on where to place it in the cabin. The opening scene is shot at night and shows Latifa engaged in an erotic dance standing on the passenger seat while Alfredo is driving. The joy the couple displays gives the impression that they live a free and happy life. This, however, is quickly spoiled by Latifa's words: 'My total dream is having a normal life… yes, living like normal people… having a child.' The reality of their life is revealed in the following scene where Latifa wakes up early the next morning in the uncomfortable-looking sleeper berth. We see her brushing her teeth using a water bottle and a plastic basin in a simulacrum of a bathroom. [Fig. 2] Her husband wakes up a few hours later with coffee waiting for him, prepared by Latifa on a camp stove – the truck cabin has become a kitchen.

The truck cabin is more than Alfredo and Latifa's workplace; it is an all-in-one workplace, living room, bedroom, kitchen and bathroom. Caught between meeting ever-more-demanding delivery deadlines and complying with European speed limits (according to Francesco Mattuzzi, for every two thousand kilometres, drivers can afford to 'waste' fifteen minutes at most, while maintaining a maximum speed of ninenty kilometres per hour), the two take turns driving, carrying out their morning ablutions, cooking, and occasionally entertaining each other in the four square metres of the cabin. Their life appears to unroll independent of the circadian cycle. They have a meal with other drivers at night while waiting to board the ferry at Igoumenitsa, they drive at night and sleep during the day. In fact the film takes place almost entirely at night. Indeed, extended night work and working irregular hours are common practices in the transport industry, as a study by the European Commission reveals, despite the regulation of working hours by the European Union.[13] Regulation 561/2006 states that the daily rest period must be at least eleven hours, or nine hours for a maximum of three days a week. Alternatively, daily rest can be split into periods of three and nine hours. More often than not, the exceptions seem to be the rule, as the film shows. Or even worse: while complaining about the unfairness of the employer, Alfredo confesses that he had been asked to manipulate the tachograph and carry on driving during rest hours.

The moments when the couple can enjoy an escape from their routine are the mandatory stops for loading and unloading merchandise, refuelling, and passing through customs. It is then that they can meet other people, usually other drivers, have lunch or dinner seated at a table or even play hide-and-seek between parked vehicles. The parking lot, the gas station and the customs office are not just places where the flows of goods temporarily come to a standstill but also places of interaction and socialising for people working in logistics. Recreation, which in the days of large unions took place in clearly-defined places such as the canteen and the worker's club at precise moments of the day, now happens in appropriated spaces whenever possible. [Fig. 3]

The shift from an organised and collective form of entertainment to an improvised and individual one coincided with a shift in the way workers in

the field of logistics are controlled. During the time of the large unions, the unity of workers undoubtedly represented a force that employers needed to listen to. The fact that all employees shared the same interest and enjoyed the same forms of entertainment also meant their behaviour was easier to anticipate and therefore to control. Bread and circuses was the way to keep the masses happy. After the fragmentation of the unions the power of workers arguably diminished, but the ways to control them also had to become more complex. Technology substituted politics. As *The Weight of Dreams* shows, the truck's cabin is constantly monitored by the shipping company's command centre. Through the satellite navigation system, the truck's position is checked against the previously defined trajectory, while sensors monitor fuel consumption and speed. Alarms signal when the driver exceeds the speed limit and when a window is opened (meaning more fuel is needed to maintain the cruising speed), contributing to a neurotic atmosphere of surveillance. Thus the employee's performance is always under the company's scrutiny, a fact that weighs considerably when (re) negotiating a contract.

The Weight of Dreams shows that work in the field of logistics is a struggle between the desire for an efficient movement of goods and the desires of the humans who move the goods. [Fig. 4a, 4b] This translates in an ambivalent use of the common space, which on the one hand is planned for movement, but on the other is appropriated by users with the illusion of a sedentary life. The more the film's two protagonists are consumed by what they hope is a temporary condition that will eventually enable them to lead a stable life, the more it seems they cannot escape this condition: 'Do you think that if you quit as a truck driver you could work as construction worker?' Latifa asks her husband. Alfredo jokingly avoids the answer. Eventually, the couple succumbs to the need for privacy, indicating that their partnership has little chance to survive: 'It's impossible to understand each other when you are in such close contact, inside a truck cockpit … it splits you apart and separates one from the other,' laments Latifa after having an argument with her husband.

Notes

1. Interview with Francesco Mattuzzi, 11 October 2017.
2. A spokesman of the Council on Wage and Price Stability quoted in 'If the Teamsters Strike, Blame Kahn', *The Executive Intelligence Review,* 3–9 April 1979, http://larouchepub.com.
3. Christian Marazzi, *Il posto dei calzini. La svolta linguistica dell'economia e i suoi effetti nella politica* (Belinzona: Edizioni Casagrande SA, 1994), 47. This book is translated in English as *Capital and Affects: The Politics of the Language Economy* (Los Angeles: Semiotext(e), 2011).
4. *Il posto dei calzini* incorrectly states that the strike took place in 1989.
5. Helen Dewar, 'Teamsters Order Selective Strikes Against Trucking Firms', *The Washington Post*, 1 April 1979, https://washingtonpost.com.
6. Jesus Sanchez, 'Teamsters Strike Shuts Down 22 Trucking Firm', *Los Angeles Times*, 7 April 1994, http://articles.latimes.com.
7. 'If the Teamsters Strike, Blame Kahn', *The Executive Intelligence Review,* 3–9 April 1979, http://larouchepub.com.
8. 'On Carter's Anti-Inflation Policy', *The American*, 5 February 1979, http://aei.org.
9. The deregulation process in the United States was completed in 1994 when President Clinton signed the Trucking Industry Regulatory Reform Act, which eliminated the requirement that freight rates be subject to approval from the Interstate Commerce Commission (ICC). See Trucking Industry Regulatory Reform Act of 1994, Pub. L. No. 103-311, 108 Stat. 1673
10. Ibid.
11. Michael H. Belzer, 'Collective Bargaining after

Deregulation: Do the Teamsters Still Count?' in *Industrial and Labor Review* 38 no. 4 (July 1995): 653.
12. OECD, *Liberalisation and Structural Reform in the Freight Transport Sector in Europe* (Paris: OECD, 1997), 15–16
13. SafetyNet, *Fatigue* (2009), https://ec.europa.eu.

Biographies

Renzo Sgolacchia is an Italian architect active in Rotterdam. He is the founder of Cinema Architecture, a project combining research and film screenings, which investigates architectural space through cinema. He graduated *cum laude* from the Faculty of Architecture of Roma Tre University in 2010. He is currently curating the new programme of Cinema Architecture 2017–18 called *Itinerant Movies*, focusing on films shot entirely in a vehicle.

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Review Article

HomeWorks

Marcello Tavone

Palimpsest

What if the city of the twenty-first century was not as we have imagined it? What if the culture of congestion was swept away by an isotropic, weak and diffused urban reality; by the culture of dispersion? A nebulous and potentially limitless city freed from any physical and symbolic centre, where uncertain attempts of urbanity overlap with the idealised landscape of the countryside.

From this perspective, the central area of the Veneto region in Italy can still be considered a laboratory that produces urban and architectural forms for the contemporary city. By recalling the work of Andre Corboz[1], Bernardo Secchi and Paola Vigano[2], the Veneto territory is here considered as a palimpsest, as the product of a slow and incessant process of accumulation of traces, elements, attempts, which have been overlapping over centuries.

The structure of this article reflects the stratification of the territory: the elements presented here are only a few of the layers that compose the image of this region; they serve as evidence in the investigation of the role that anthropisation processes have played in the continuous modification of the landscape. Within this frame, the 'architecture of logistics' is presented as one of the elements that have imposed a pervasive economic-political control of the territory, to the point of producing specific forms of living.

Limits

Veneto became a Roman colony in the third century BC. Colonies were settlements founded by the Romans to secure conquered territories by imposing military, economical and juridical authority. The fundamental tool used to impose such control was the 'centuriation' (in Latin *centuriatio* or *limitatio*), the subdivision of land based on a square grid. [Fig. 1]

In its radical simplicity the grid served multiple purposes. First, it was a tool to measure and to define the limits of the new territories: topography made it possible to quantify the extent of Rome's sovereignty. Most of the conquered land was considered public (the *ager publicus populi romani,* or public land of the Roman citizenry), the rest was divided into private properties and distributed to veterans (the *ager viritim divisus,* or land assigned to private citizens). Land, rather than money, became the main reward for legionaries who soon understood that there was a much more enduring connection between private property and personal political-economical power.[3]

Topography and land allocation allowed Rome to create a first land registry, an abstract representation of the *form* of territory. In fact, Romans used bronze tablets, called *forma coloniae*, to draw the map of the *limits* of the new colonies and their internal subdivision. Land measurement and political order were indissolubly bound: the *forma*

coloniae was joined by the *lex coloniae*, a juridical system which imposed the legal and fiscal principals of Roman domination on a specific territory. Despite its geometric neutrality the grid was a device that provided controlling power and individual freedom.

Territory

Centuriation led to a rationalisation of agricultural production due to vast deforestation and reclamation works and to a general regularisation of the hydraulic system. The productive essence of the grid is particularly evident in the Veneto countryside, where its orientation does not follow the cardinal points, but rather the slope of the land, the flow of water and the orientation of the sun. In this sense we can say that the Roman grid did not imply a total subjugation or obliteration of nature. The grid was rather conceived as a tool to modify[4] an existing natural reality, as a monumental project of the soil.[5]

The massive earthworks required for constructing the grid could only be provided by the army. Military logistics, meaning 'the branch of military science relating to procuring, maintaining and transporting material, personnel and facilities' was the science that ruled land surveys, property allocation, and infrastructural engineering. The centuriation itself can be considered as a device used to design a specific geography of war, since it facilitated the movements of troops, their spatial distribution and the ability to rapidly restore the supply of ammunition, both in peace- and wartime.[6]

The indissoluble relationship between the grid and military occupation is reflected in the fact that the *castrum* (the military camp) was usually built at the crossing point between the grid's two main axes, the *kardo* and *decumano*. The *kardo maximus* often corresponded to the prolongation of a consular road, providing a direct connection between Rome and the new territories. The two axes were then repeated in parallel in the vast rural landscape.

Spatial domination was thus constituted by two contrasting elements: on the one hand the military camp, conceived as a limited walled settlement; on the other hand the grid, a potentially never-ending infrastructural system.[7] The dialectic between these two figures was at the root of the very concept of 'territory': the Latin word *territorium* designated, in fact, the land (*terra*) surrounding a military camp, used by legions for sustenance.[8]

Villa I

The gradual process of inhabitation of the countryside produced a specific architectural type: the *villa rustica* or 'working villa'. Unlike the urban villa, the rustic villa was a productive place, a farm-house estate, dedicated to both agricultural and artisanal activities.

The rustic villa was loaded with cultural symbols and meanings: it represented the place where one could rediscover and celebrate a set of conservative values that had vanished in the dissoluteness of urban life. In this sense, it was proudly anti-urban; its productive nature provided both economic independence and political autonomy. The rustic villa exacerbated the dialectic underlined by Aristotle between the city, meant as the public place of the *techné politikè* (politics), and the house, conceived as the private space of the *technè oikonomikè* (economics). Within the villa's boundaries the owner (the *dominus*) dominated not only the relations connected to household management, but also those related to production logistics, by managing work loads, storage and supply.[9]

In the sixth book of *De Architectura*, Vitruvius meticulously describes the *villa rustica*. Vitruvius lays greater stress on the fact that the villas must be functional, efficient and productive.[10] He claims that even the symmetrical compositions that should guarantee the classic principles of *venustas* (beauty) must be applied only if they do not compromise

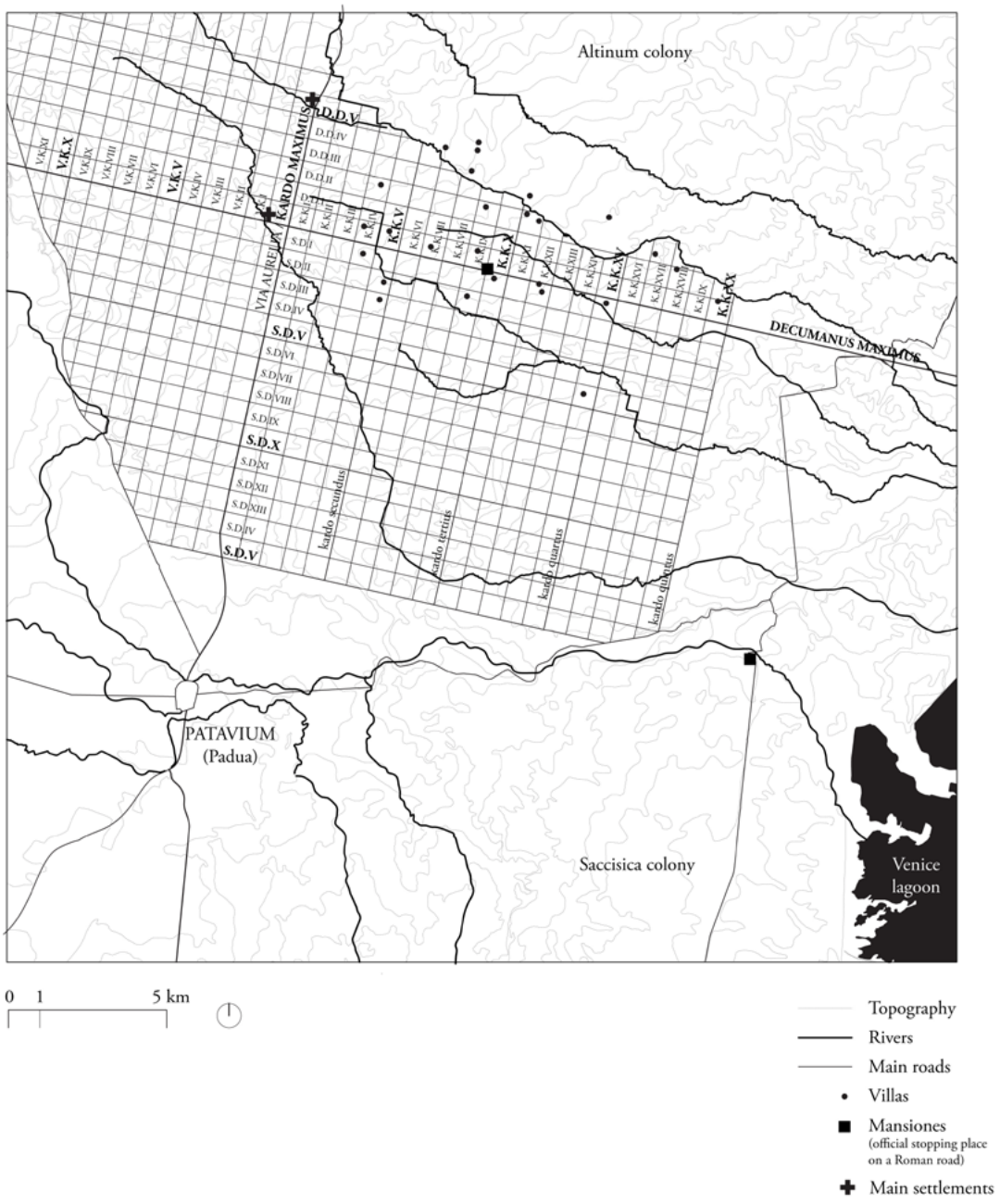

Fig. 1. The Roman centuriation between Padua and Venice. Drawing: author.

those of *utilitas* (utility). In fact, Vitruvius does not describe the elements of an architectural object, but rather the functioning of a family factory, in which the size, the organisation and orientation of the various environments are not linked to any architectural language, but rather to production efficiency.

Villa II

In 1570 Vitruvius's text was taken up by Palladio, who in the second of his *The Four Books of Architecture* described and redrew the 'villa of the ancients', underlining the relationships between working and living spaces.[11] The Roman *villa rustica* represents an essential reference used by Palladio to design several of his venetian villas. Both the Roman and the Palladian villas were directly related to agricultural production; both provided cultural and political control over the rural landscape; both symbolised the social tension between the city (Venice) and its territory (Veneto). Palladio succeeded in defining an architectural language capable on the one hand of expressing the cultural ambitions of the new Venetian patrician class and, on the other, of assimilating traditional architectural elements linked to agricultural production. This strategy is reflected in the juxtaposition of two elements, combined to different degrees: on the one hand the villa's central body – with the rooms of the owner's family – and on the other, the barns – for tools, animals and servants.[12] Palladian villas staged an ever-changing dialectic between symbolism and pragmatism, between freedom and servility.

Empire I

The history of the Roman Empire is the history of an act of spatial ordering. It is on the basis of such order that Rome was able to establish a new juridical system, whose stability was provided by conquering and by assimilating everything that was 'other'. Within the limits of the empire everything was dominated, controlled, foreseen. Conversely, everything that remained outside its borders was considered unpredictable, unstable and then antagonistic. In order to be compelling Rome's power must be uniforming, totalising, boundless, global: preventive war was always a 'just war'.

Spatial and cultural uniformity were guaranteed by urbanisation (meant as a pervasive process of infrastructural development) and architecture. In fact, on the one hand architecture was governed by a codified language capable, at the same time, of imposing the values of the Roman culture and of absorbing indigenous specificities. On the other hand, centuriation was a generic infrastructural system that could assure fiscal taxation, military control and commercial efficiency, by guaranteeing flows of goods, people and information. 'Every new age and every new epoch in the coexistence of peoples, empires, and countries, of rulers and power formations of every sort, is founded on new spatial divisions, new enclosures and new spatial orders of the earth.'[13] The Roman Empire imposed a territorial order that was rational, generic[14], isotropic.

Isotropy

Isotropy comes from the Greek words *isos* (equal) and *tropos* (way) and means uniform in all directions. The concept of isotropy underlies an absence of hierarchy, of specificity, of limits. Isotropic space is repetitive, serial, neutral. Its lack of quality makes it open to the possible, to the most disparate and contradictory scenarios.[15]

The urban figure that best translates the concept of isotropy is the grid; its architectural equivalent is the typical plan. Both allow for the absorbtion of the most unpredictable programmatic fluctuations; both tend to a zero-degree of architecture, to the 'almost nothing'.

The long processes of anthropisation which occurred over more than twenty centuries have transformed the Veneto region into an isotropic territory. [Fig. 2] The elements of which it is composed are always the same, but they are assembled in

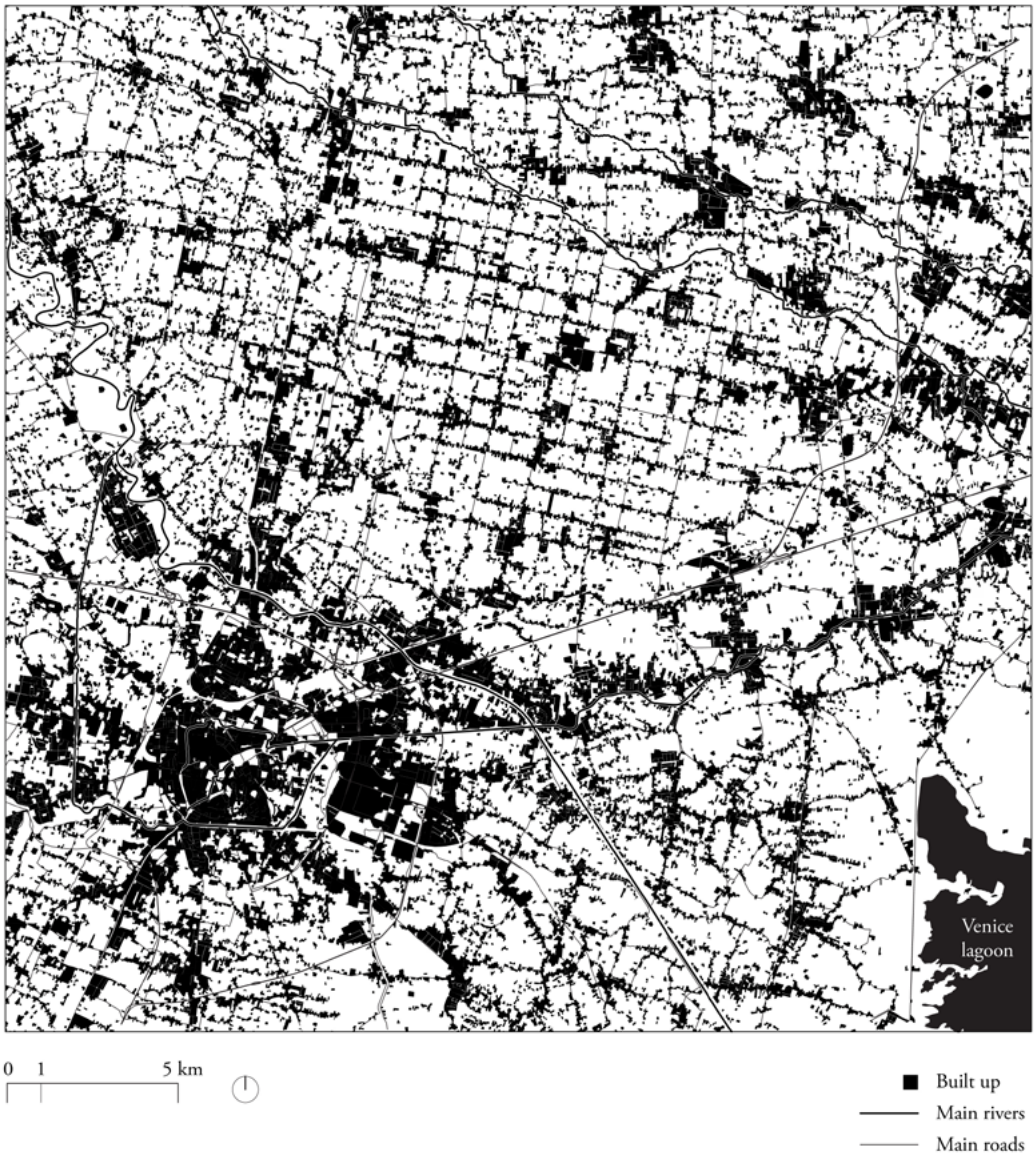

Fig. 2. The isotropic urban phenomena between Padua and Venice. Drawing: author.

ever-changing configurations, scattered in a vast rural landscape: private houses with gardens are juxtaposed with industrial warehouses, agricultural fields, greenhouses, gas stations, showrooms, sport fields, shopping centres, workshops, farms, villas, bell towers and chimneys.

Isotropy is a political figure: it can be seen as the metaphor of a democratic, horizontal, open society. Isotropy stages, at the same time, mass culture and individual freedom, capitalist technological rationalism and the autonomy of the subject: the Veneto region is composed of a nebula of individual utopias and domestic paradises. People have seen in Veneto a new freedom of living in Europe; the freedom from the compact city.

The dense and pervasive presence of infrastructures (asphalt and water) has turned Veneto into a flexible territory, irrigated with an uncommon economical potential: a fertile land to develop decentralised forms of production. The territories of isotropy are disillusioned and practical: Veneto is a reminder of the decline of the 'strong thought': any form of knowledge and, by consequence, any attempt at large-scale planning, is accepted not because of its ability to manifest an ideology or an incontrovertible truth, but only because it allows the achievement of the goals set by the market-economy. This is why logistic science has become such a dominant form of knowledge: it represents the most effective discipline for 'planning, implementing and controlling procedures for the efficient and effective transportation and storage of goods from the point of origin to the point of consumption'.[16]

Miracle

Until the end of the 1950s, the Veneto region was one of the poorest areas in Italy. It was a predominantly agricultural territory, characterised by low productivity, an extreme fragmentation of farmland property (one hectare per family), high rates of emigration, flood crises, and poor food and hygienic conditions. Veneto was 'the South of the North'. From an economic perspective the only exceptions were represented by the industrial poles of Marghera (petrochemical industry) and Vicenza (textile industry), two examples of classic Fordist standardised mass production and mass consumption.

Nowadays, despite the economic uncertainties of the last ten years, the region remains one of the most populated and productive of Italy and one of the richest areas in Europe.[17]

Things had begun to change when families, in order to overcome poverty, started running extremely simple artisanal businesses in parallel to their main farming activities. They were working at home or at most in the shed out in their back garden. In the space of twenty years, this rarefied nebula of family-based firms became one of the world's best examples of an innovative post-Fordist industrial system. Sheds have since been replaced with small logistic warehouses, old farm houses have been turned into workshops, farm storages into small factories.

One of the key elements of this economic miracle was the natural ability of different businesses to create a widespread network. Companies started to share their knowhow, to specialise their production and to create small industrial districts: whether consciously or unconsciously they were recreating a production chain scattered on a territorial scale.

Capitalism

During the 1980s a Fiat union worker, asked to describe the new dimensions of post-Fordist production in Northern Italy, explained that if in the past the workers entering in the factory could find a bulletin board detailing the production breakdown, now, by contrast, they would have needed a 'territorial' board to reconstruct the geography of manufacturing.[18]

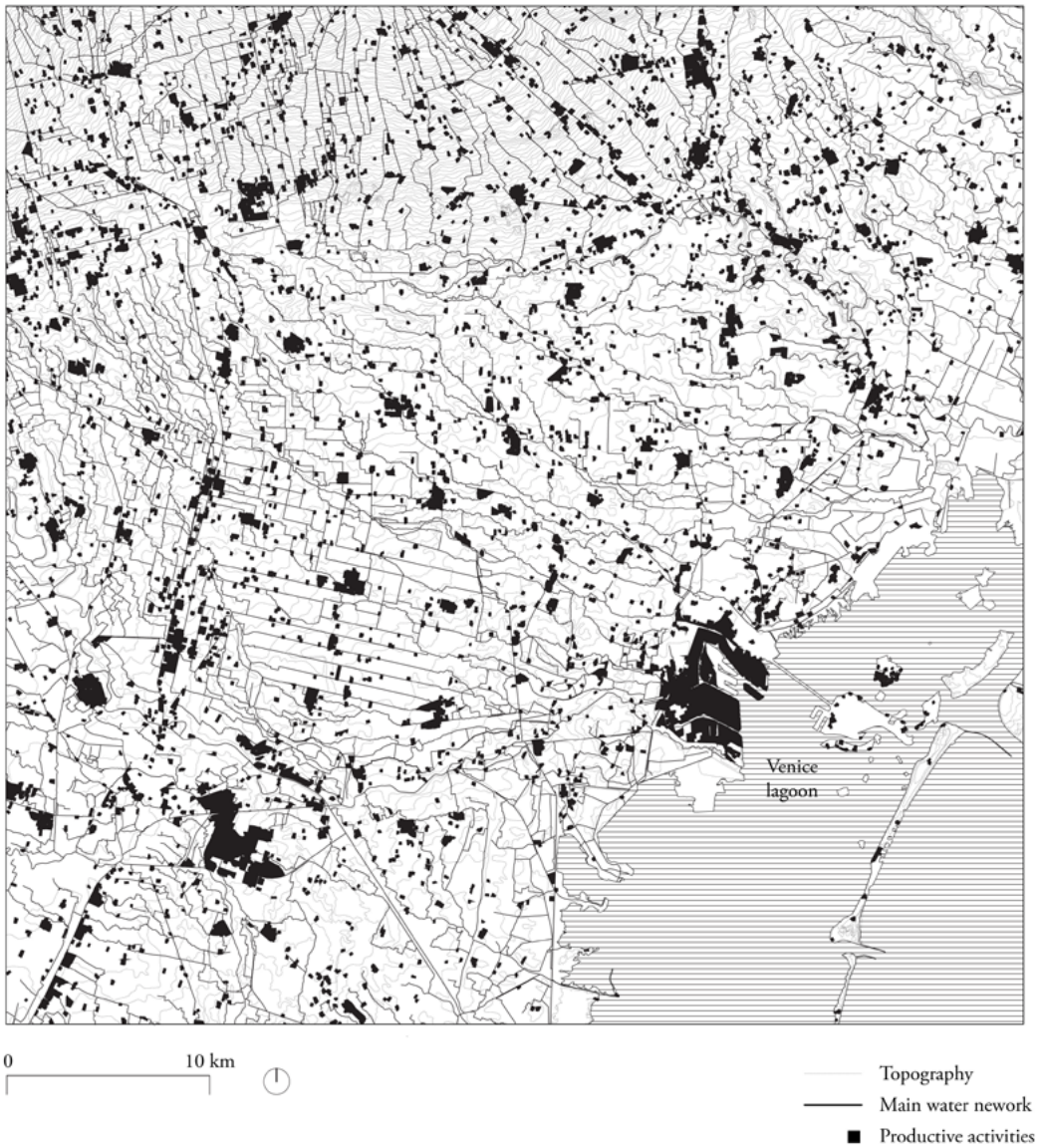

Fig. 3. The territorial diffusion of productive activities in the Veneto metropolitan area. Drawing: author.

The gradual decentralisation of industrial production, which in the past was all condensed in the urban space of the factory, led to the rise of the Veneto contemporary metropolis. The Veneto *città diffusa* is, in fact, a metropolis in which the economical development of small and medium sized enterprises was superimposed, on a territorial scale, on the traditional universe of agricultural production. This superposition was supported by a euphoric political *laissez-faire*. From this perspective Veneto represents an alternative to the model of the modern western metropolis: its metropolitan development was not generated by the simple extension of an existing urban fabric, but rather by the gradual densification of an already inhabited rural landscape. Nevertheless, I don't think we can consider the Veneto *città diffusa* literally as a *Großstadt*, since it lacks that civic sense that lies at the very root of the concept of the city. Veneto is instead a territory-factory, an unidealised 'Agronica'.[19] [Fig. 3]

Villa III

One of the most interesting architectural types produced by the Veneto metropolis is the *casa-capannone* or *casa-laboratorio* – which I'll be calling *HomeWork* [Fig. 4–12].[20] *HomeWorks* are hybrid devices composed of a shameless superposition or juxtaposition of a single-family detached home with an industrial warehouse. In this sense, it is an architectural machine that represents the quintessential example of a specific form of Post-Fordism, based on highly decentralised industrial production and on an ambiguous relationship between living and work spaces.

HomeWorks are a kind of *cadavre-exquis* of the two main symbols of Veneto economical wealth: the *villetta* (the detached house) and the *capannone* (the workshop). In many ways Veneto's formal vocabulary is indexed by these two typologies, with the house celebrating individual freedom and the warehouse representing the rituals imposed by economy.

Sometimes the clash between the bucolic specificity of the rural landscape and the disturbing aesthetic of these hybrids produces a sense of unexpected beauty: is this the ultimate portrait of this rising metropolis, our Proustian madeleine?

Home

The single-family detached home is, first of all, a status symbol: it is, at the same time, proudly anti-urban and contemptuously anti-rural. The *villetta* is often exuberant and architecturally uninhibited; it can be built by following any style: neo-classical, neo-Palladian, Tuscan, modern, rationalist, post-modern, international. The smallest common denominator within such a chaotic formalism is the property wall: the detached house is introverted, protected by fences, hedges, gates. Home security is an asset; this is why every smart technology is employed to install alarm-, lighting-, camera systems and motion detectors.

Unlike the Palladian villa, the detached house does not engage in any dialogue with the surrounding landscape. The nature which surrounds the house has to be delimited, safe, private. Nature can have a two forms: the domestic garden and the vegetable garden. The vegetable garden is a miniature of the surrounding productive landscape; it is often hidden in the backyard, it is the leftover of an agricultural tradition which new entrepreneurs prefer not to celebrate.

The domestic garden is a symbolic space, a small paradise on earth where families amass fetishes and allegories: classical or fascists sculptures together with garden gnomes, symbols of regional irredentism and exotic vegetation, inflatable swimming pool and fake wells, peace flags and beware-of-the-dog signs. Sometimes detached houses lie on a small artificial embankment. Topography alters the relationship between the house, the fence, and the surrounding context by suggesting that showing off beats security.

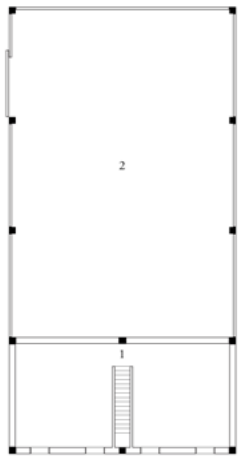

Fig. 4

Fig. 5

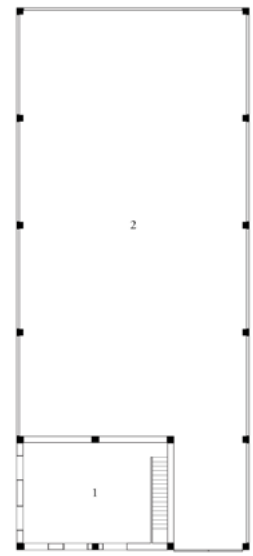

Fig. 6

Fig. 4, 5: *Homework* in Padua. 1. Home, 2. Workroom. Drawing: author.

Fig. 6: *Homework* in Vicenza. 1. Home, 2. Workroom. Drawing: author.

Fig. 7

Fig. 8

Fig. 9

Fig. 7–9: Filippo Minelli, *Atlante dei Classici Padani* (Brescia: Krisis Publishing, 2015).

Fig. 10

Fig. 11

Fig. 12

Fig. 10–12: Photos: author.

Work

The shed is austere, inexpressive, cheap. It often consists of an ordinary concrete or prefabricated steel box, with no specific qualities except for its wide-span structure. Its radical lack of quality makes it unbearably contemporary, undoubtedly global. The shed is the place of the *Veneto che lavora* (Veneto that works), of the economic initiative of small entrepreneurs (often of working-class origin) and of a general spirit of sacrifice. Like the Silicon Valley garages, the shed or the 'workshop' became an inescapable *topos* in corporate rhetoric, by suggesting a dense mixture of individual creativity, humility and persistence. The shed is remembered with a sort of innocent nostalgia in the storytelling of all major entrepreneurs: Leonardo Del Vecchio, the second richest person in Italy, started his career in Veneto, from a 'small mechanical workshop for third parties to what Luxottica is today, a leader in the design, manufacturing, distribution and sales of premium, luxury and sports eyewear'.[21]

On the other hand it is often a place of exploitation, of weak union power and of illegal work. The generic spatial flexibility of the warehouse reflects the 'generic flexibility' of labour power, which must be able to adapt to ever-changing working conditions.

Hybrids

HomeWorks suggests a double image of the family. On the one hand, the family can be seen as a compact nucleus in which various members work to support a certain productive activity. On the other hand, as a group managed by the paternalistic authority of the 'father-master', which is seamlessly imposed both on a family and professional environment, within domestic and productive spaces.

Ambiguities persist on a political level. Small business owners represent a fundamental part of the Lega Nord's electorate, a far-right, regionalist and ethno-nationalist party. Veneto's entrepreneurs fear state regulation, the European Union, global competition, immigration and the idea of a multi-ethnic society. Immigrants must leave the cities but they can stay in the sheds behind the house. People often rage against the negative impact on the local economy caused by the exploitation of migrants, but rarely against the system that benefits from such exploitation. In this sense, the shed can be seen as a parasite that modifies its host's behaviour.[22]

The relationship between HomeWorks' living and productive areas is never egalitarian: production activities have an indisputable priority in the occupation of space. It often happens that the ground floor of the house is turned into a small store or a showroom, the first floor into an office. The office is the managerial space *par excellence*, where office business bureaucracy goes with logistics management: it is the place where the company owner can plan the flow of supplies, activities and shipments.

Thanks to gradual building extensions, domestic spaces are usually moved to the second floor or eventually to the third in order to accommodate the second generation of the family. From this point of view, HomeWorks represents one of the rare building types that guarantees a dense mix of programmes.

Ruins

The 2008 financial crisis has severely affected the Veneto economy. Among the ruins of the post-Fordist metropolis, there are more than 12,000 empty warehouses, an unproductive capital estimated at around 4 billion euros.[23] Lately, logistics has become the most diffused and effective industrial activity with which to recycle vacant buildings: small sheds are transformed into storage spaces for those large brands that have survived the recession. The biggest obstacle to this transformation is size. If in the past one of the mottoes of the Veneto economic model was 'small is beautiful', today the

large distribution industry has realised that 'small is inefficient': size matters, and many warehouses cannot be reused because they are simply too small to store the goods of large companies. Big corporations are inaugurating an era of new gigantism whose new dictum is 'small was cute, but big is better'.

In 2017 a maxi hub was built in the Verona area for the Number 1 logistics group, an Amazon distribution centre in Padua, a giant fulfilment warehouse of the Despar brand near Rovigo. The logistics sector is, in effect, imposing a new economic model and, by consequence, a new spatial order which prefers great traffic arteries to the isotropic secondary network, robots to skilled workers, and a compact intermodal hub to decentralised productive districts.

Empire II

In a 1975 interview, Pier Paolo Pasolini said:

> Capitalism is today the protagonist of a great internal revolution: it is evolving, revolutionarily, into *neo-capitalism* … Such a revolutionary, progressive and unifying *neo-capitalism* generates an unprecedented feeling of world unity. Why is this happening? Because *neo-capitalism* coincides with the complete industrialisation of the world.[24]

Pasolini was among the Italian intellectuals who most criticised the process of cultural homogenisation imposed by capitalism, underlining its global and all-encompassing character. In his opinion, the city and the territory were the first witnesses of such transformation. As a matter of fact, the last layer of the Veneto metropolitan palimpsest is composed of pure generic architecture: anonymous shopping malls, science parks, large road infrastructure and logistics terminals. After the financial crisis only those medium-sized companies that already had strong relationship with the global market managed to survive. Localism is already part of the legend and even *HomeWorks* are now listed in the endangered species. Will they be saved by the next Davos summit, by the umpteenth industrial revolution?

22 October 2017: the referendum on Venetian autonomy. The day the 'yes' vote prevails: the great majority of voters overwhelmingly backed greater political and economical autonomy from Rome. Is regionalism a desperate counteraction to global economy or rather a consequence? The confirmation of the falling of nation-state sovereignties? Is Europe destined to become a fragmented federation of regions sharing market treaties, rather than the civic principles of democracy? During recent decades Italy has been governed more and more by 'cabinets of experts', grand coalitions or 'caretaker governments'. The overcoming of the left-right division is not a political statement but a disenchanted observation.

Are these the symptoms of a general acceptance of the rules imposed by a much wider and boundless authority 'that effectively encompasses the spatial totality, or really that rules over the entire "civilised" world. No territorial boundaries limit its reign.'[25]

Will urban planning become just another world to indicate logistics?

Notes

1. André Corboz, 'Le Territoire comme palimpseste', in *Casabella* 516 (1985): 22–27.
2. The idea of 'the land as palimpsest' is a persistent *topos* that occurs in the entire work of Bernardo Secchi and Paola Viganò.
3. Stuart Elden, *The Birth of Territory* (Chicago: University Of Chicago Press, 2013).
4. Vittorio Gregotti, 'Architettura come modificazione', in *Casabella* 498–499 (1984): 2–7
5. Bernardo Secchi, 'Progetto di suolo', *Casabella* 520 (1986): 19–23.
6. The relationship between logistics and military science

is brilliantly analysed in the essay by Francesco Marullo, 'Logistics Takes Command. Architecture, Warfare, Abstraction' in *Log* 35 (Autumn 2015): 103–120.

7. The relationship between the Roman *castrum* and *centuriatio* alludes to the one between Roman *civitas* and *urbs* formulated by Pier Vittorio Aureli in *The Possibility of an Absolute Architecture*, (Harvard: MIT Press, 2011), 6–9.
8. Elden, *Birth of Territory,* 64.
9. Carnes Lord, *Aristotle's Politics* (Chicago: University of Chicago Press, 2013). On the Aristotelian concept of *oikonomia* as management of family and household, see Hannah Arendt, *The Human Condition* (Chicago: University of Chicago Press, 1998 [1958], 28–29) and Giorgio Agamben, *The Kingdom and the Glory: For a Theological Genealogy of Economy and Government,* (Stanford: Stanford University Press, 2012), 17–50 and Aureli, *Possibility of an Absolute Architecture*, 6–7.
10. Marco Vitruvio Pollione, *De Architectura,* trans. L. Migotto (Pordenone: Edizioni Studio Tesi, 1999 [1486]).
11. Andrea Palladio, *I quattro libri dell'architettura* (Milan: Enrico Hoepli Editore, 2014 [1570]).
12. The relationship between living and productive spaces in Palladian villas is analysed by James S. Ackerman in *The Villa: Form and Ideology of Country Houses* (Princeton: Princeton University Press, 1990) and by Amir Djalali, 'Prehistories of Common Space: Conflict and Abstraction in Renaissance Architecture' in, *The City as a Project,* ed. Pier Vittorio Aureli (Berlin: Ruby Press, 2013), 102–136.
13. Carl Schmitt, *The Nomos of the Earth in the International Law of the Jus Publicum*, trans. G. L. Ulmen (Candor, NY: Telos Press, 2003 [1979]).
14. The genericity of the Roman urban system is analysed by Rem Koolhaas and the Harvard Project on the City in 'How to Build a City: The Roman Operating System', in *Mutations*, (Barcelona: Actar, 2011), 10–20.
15. The concept of 'isotropy' and its application to the Veneto territory is at the centre of Paola Viganò's research. See Paola Viganò, 'Water and Asphalt, The project of Isotropy in the Metropolitan Region of Venice', *Architectural Design*, vol. 78 (2008): 34–39 and *I Territori dell'urbanistica. Il progetto come produttore di conoscenza* (Milan: Officina, 2010).
16. Glossary of the Council of Supply Chain Management Professionals, http://cscmp.org.
17. Eurostat: http://ec.europa.eu/eurostat.
18. Aldo Bonomi, *Il capitalismo molecolare*, (Turin: Einaudi, 1997).
19. 'Agronica' is a project developed by Andrea Branzi between 1993 and 1994. It explores the potential relationships among agricultural and energy production, post-Fordist industrialism and new form of consumption. See Andrea Branzi, *Modernità debole e diffusa*, (Milan: Skira, 2006).
20. The typology of the *casa-capannone* was presented by Stefano Munarin and Maria Chiara Tosi in *Tracce di città* (Milan: Franco Angeli, 2002) and by Giancarlo Paba, 'Tre momenti della crisi del piano urbanistico: la crescita del territorio, la diffusione della casa-laboratorio, il sistema dell'iperrappresentatività politica', in *Piccola città e piccola impresa*, ed. Raimondo Innocenti (Milan: Franco Angeli, 1985).
21. 'Meet Leonardo del Vecchio', Luxottica website, last updated 17 February 2018, http://luxottica.com.
22. The transformations in the Veneto's production landscapes and the emergence of new political discourses is analysed by Luiza Bialasiewicz in 'The Geographies of production and the contexts of politics: dis-location and new ecologies of fear in the Veneto città diffusa' in *Environment and Planning D: Society and Space,* vol. 24 (2006): 41–67.
23. Katy Mandurino, 'Da abbattere o riconvertire. La scelta del Veneto sui capannoni vuoti', *Il Sole 24 Ore*, 9 February 2018.
24. Pier Paolo Pasolini, *Saggi sulla politica e sulla società* (Milan: Mondadori, 1999)
25. Antonio Negri and Michael Hardt, *Empire,* (Harvard: Harvard University Press, 2000).

Biography

Marcello Tavone is an architect and urban designer based in Paris. He studied at the Technische Universiteit Delft (NL) and at IUAV in Venice, where he graduated in ‘Architecture for the city’. By collaborating with the Parisian offices of l’AUC, Dominique Perrault Architecture and Wilmotte & Associes he has been able to develop projects on various scales: from prospective metropolitan research, to master-planning, public/private partnership, conceptual studies and curating. Marcello collaborated with *Architecture d’Aujourd’hui* and he was invited as guest critic at the Ecole Speciale d’Architecture in Paris.
In 2018 he founded ‘ON CITIES’, an office for architecture and urban design.

Review Article

Ambiguous Territory: Aesthetic Practices Against Agrilogistics

Kathy Velikov, David Salomon, Cathryn Dwyre, and Chris Perry

What can one do when the things and processes used to sustain oneself – physically, economically, emotionally—are executed at a scale and intensity whereby they become poisonous? Such a scenario describes certain addictions. What had originally been procured to alleviate a problem becomes the cause of a different, even more dangerous disease.[1] What happens when such a scenario exists at the scale of an entire species?

An instance of such an addiction on a planetary scale is exemplified by the neologism *agrilogistics*.[2] This planned approach to the environment began with the advent of agriculture, the so-called Neolithic Revolution in the early Holocene era, and sought to organise, divide, and manage the earth in order to increase the likelihood of human survival.[3] Remarkably, agricultural practice had an immediate and measurable impact on global ecologies.[4] One of the first climate scientists, geochemist Vladimir Vernadsky, wrote in 1924 that

> in our geologic era – a new geochemical factor of paramount importance appears. During the last 10,000 or 20,000 years, the geochemical influence of agriculture has become unusually intense and diverse. We see a surprising speed in the growth of mankind's geochemical work. We see a more and more pronounced influence of consciousness and collective human reason upon geochemical processes. Man has introduced into the planet's structure a new form of effect upon the exchange of atoms between living matter and inert matter.[5]

Vernadsky's prescient observations have become a widely accepted fact. This application of logistics to wilderness resources, whose practice began thousands of years ago, has come to define not only the onset of the Anthropocene epoch but also the birth of a recursive and addictive relationship between humans and the planet.

If one can understand agrilogistics as the defining mechanism of civilisation – of which neoliberalism is only one of the more recent and globally pervasive frameworks – it is possible to recognise how humankind's massive manipulation of environments and energies to feed and sustain its sedentary societies has expanded to the point of collapse. The would-be smooth space of exchange promised by logistics can only be made possible by an unrelenting rule of separation and by the increasing ability to transform all qualities into quantities so that the only relations possible are those of computationally exact management and control. Yet this ambition to eliminate frictions and anomalies through the management of calculated flows and productivities regularly produces mutations and monstrosities at multiple scales. From parasite-vulnerable monocrops, rapidly rising global temperatures, uncontrollable algae blooms, and drained lakebeds, to systemic biopolitical violence upon indigenous peoples as

well as factory and migrant labourers. These conditions expose the dark and unwanted externalities to the logistical algorithm that we have only recently begun to understand as deeply intertwined with atmospheric, biological, and geological processes and as impactful not only at their immediate scale but at the scale of the planet itself.

What can art and design do to intervene in this positive feedback loop of economic growth and environmental catastrophe? The late author Ursula K. Le Guin argued that

> we have got to change our minds. To use the world well, we need to relearn our being in it. Renew our awareness, our belonging to the world. How do we go about it?… we need the language of both science and poetry to save us from ignorant irresponsibility.[6]

Perhaps one thing we can do is to use the media of art and design to start to think the world differently; to think what it means to abandon boundaries between the human and the nonhuman, to find kinship with other species, to decentralise the human from a position of privilege, to think by way of timescales outside of one's own existence, to reveal the strangeness of this normalised and therefore invisible state of affairs, to consider how we might 'love our monsters' as opposed to abandoning or ignoring them, and rethink the *nature* of nature.[7] Now self-conscious of the planetary agency of our species to radically alter the global climate, the behaviour of ecosystems, and the possibilities of our own survival; aware of our *being in* the world and our *being with* other species, how do we prepare ourselves 'for a radically new environment, with its own internal landscape and logic, where old categories of thought would merely be an encumbrance'?[8]

Ambiguous Territory: Architecture, Landscape and the Postnatural is an exhibition curated by Cathryn Dwyre, Chris Perry, David Salomon, and Kathy Velikov, that first opened in the autumn of 2017. [Fig. 1] The exhibition assembles over forty contemporary projects by architects, landscape architects, and artists whose work challenges the division between the built and the natural environment and whose deployment of alluring yet unnerving aesthetics, of sensibilities that overcome the senses, work to expand our capacity to make sense of and find new ways of operating within the Anthropocene. Defined by uncertainty and indeterminacy, ambiguity would appear to be the antithesis of knowledge production and problem solving. Yet, in this assemblage we position it as a possible device of knowledge making itself. Ambiguity is productive to critical intellectual and aesthetic inquiry, with its ability to hold multiple, sometimes contradictory ideas together at once, ultimately producing a fertile source of novel relations. William Connolly argues that an appreciation of the ambiguous character of its own most cherished standards and principles is essential to political life in order for democratic politics in modern society to flourish. An aversion to ambiguity is what characterises societies of control, and the social politics of the disciplining and normalisation of the self, as well as the logics of separation.[9]

The works assembled in *Ambiguous Territory* indicate a shifting tide of practices, objects, and images that points to ways of operating within this new paradigm. In an age where humans have been fundamentally displaced from their presumed place of privilege, philosophically as well as experientially, and the status of nature as an antidote or respite from humans' hubris has vanished, can architects, landscape architects, and artists propose new affiliations and avail new ways to approach contemporary questions regarding the environment? In other words, what new worlds, what new natures, and what new sensibilities can art and design reveal and create that other modes of inquiry and knowledge cannot? This assemblage of work aims

Fig. 1

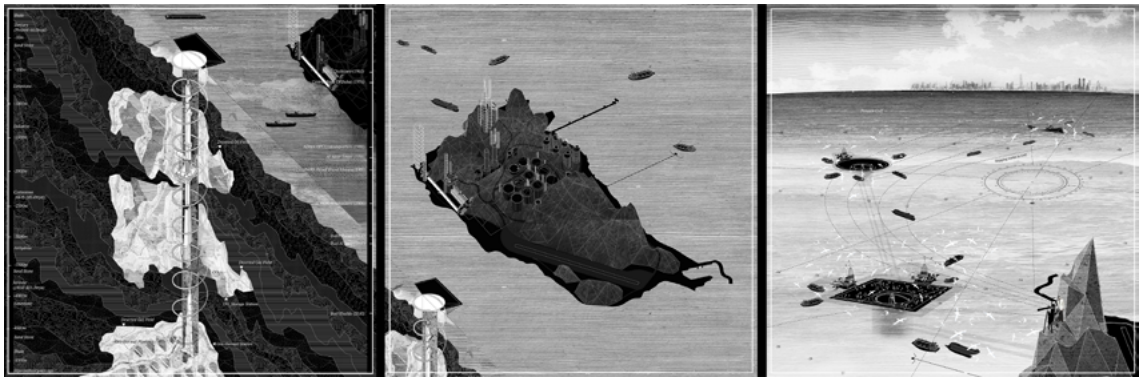

Fig. 2

Fig. 1: *Ambiguous Territory* Exhibition, University of Michigan Taubman College of Architecture and Urban Planning, 2017 © Peter Smith Photography

Fig. 2: Design Earth, *Das Island, Das Crude* (2016)

to expand the discourse and design possibilities of ecological thought beyond the constraints of the clear-cut, comforting, and utilitarian and bring them into the realm of the ambiguous and the unsettling. This work draws upon and highlights the often violent methods and unsightly outcomes of our existing age and the urgent need to respond to them with new aesthetic, social, and political forms.

In this context the artists and designers *in Ambiguous Territory* are positioned neither as problem solvers nor as priests; they are not the keepers of sacred knowledge. Rather, they are fictional truth-tellers who present alternative visions of the present as well as the future. They are not just witnesses to an unfolding and inevitable tragedy but are actors in it, often taking on an extreme form of action; an aesthetic and an ethic that is at once truth and fiction, ambiguous yet tangible, excessive and, ultimately, necessary as a response to the extremity of our age.

Note: All project description texts quoted from statements submitted by the artists to the exhibition.

Das Island, Das Crude [Fig. 2]
Design Earth (Rania Ghosn and El Hadi Jazairy)
Das Island, Das Crude is one of three projects in the *After Oil* series that renders visible the geographies of fossil fuel and speculates on the long-ranging effects of such crude relationship to the earth. Das Island is a major Emirati offshore oil and gas industrial facility that has financed the urbanisation of Dubai and Abu Dhabi. The significance of such underground resources has been abstracted from the prevalent city-centric framing of urbanism that relies on the 'designed erasure' of such technological geographies. In response, the series of three drawings accounts for the above and the below, for the architectural and geological dimensions, to situate the urban transformation of Dubai and Abu Dhabi as fragments of narratives within the thickness of the earth's crust. The sectional portrait of the territory indexes the displacement of value in the history oil urbanism by drawing together, and within the same timeline, the country's architectural icons and the depth of oil extraction. Accounting for all material externalities of crude extraction, the project gives form to the accompanying volumes of excavated soil and stone. Such matters of the earth are assembled into an artificial mountain, a landform monument to the age of oil.

Atacama Lithium Mine, Chile [Fig. 3]
Unknown Fields (Kate Davies and Liam Young)
The image of the Atacama Lithium Mine is from the Unknown Fields publication, *The Breast Milk of the Volcano*. Here, Unknown Fields travels through the energy-rich landscapes of the Bolivian Salt Lakes and the Atacama Desert. Here the ground is charged with potential, for buried beneath the mirror of the world's largest salt flat, the Salar De Uyuni, is a grey gold called lithium, the key ingredient in batteries, a substance in every one of our pockets, in every gleaming device, and every electric car. Over half of the world's reserves lies untouched under these ethereal inverted skies. This is the feeding ground of the green energy revolution, pregnant with billion dollar prospects. If the future is electric then the future is here, lying in wait for the world. Unknown Fields chronicles this electric landscape, investigating the infrastructures that serve as energy conduits, to trace a wild journey of electrons from the glow of our radiant gizmos deep into landscapes far form home. The book is an account of a contemporary creation story, from the Big Bang to the battery, from the birth of lithium at the beginning of the universe to the low power warning flashing on our screens. We power our future with the breast milk of volcanoes.

Fig. 3

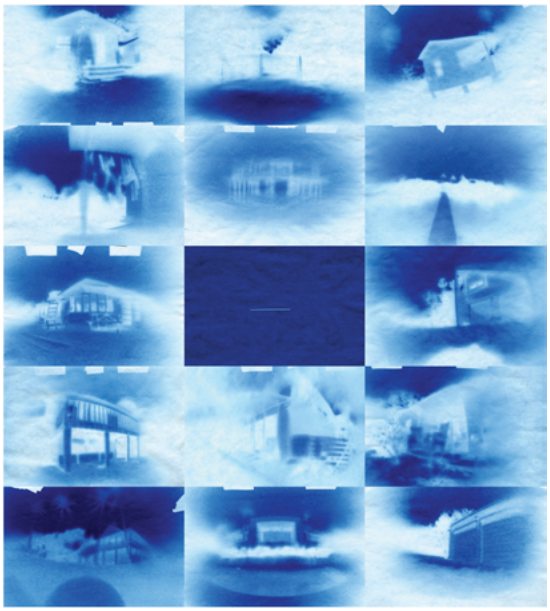

Fig. 4

Fig. 5

Fig. 3: Unknown Fields, *Atacama Lithium Mine, Chile* (2015). Image from *The Breast Milk of the Volcano*.

Fig. 4: Smudge Studio, *Conveyance* (2016). Print on paper, 51cm x 61cm.

Fig. 5: Ursula Biemann, *Subatlantic* (2015). Still from video, 11:15min.

Conveyance [Fig. 4]
Smudge Studio (Elizabeth Ellsworth and Jamie Kruse)
Conveyance responds to our sense that there is an urgent need for practices that invite humans to pay close attention to the changes that constitute the Anthropocene, to hold the thought of the reality of this new epoch, and build psychological and emotional capacities to meet and respond creatively to the unstable conditions we will continuously encounter in these new times. For us, close observation assists in fostering a deeper awareness of what we face as a species and capacities to invent new ways to live in the Anthropocene in our daily lives. The act of cultivating psychological, physical, and spiritual capacities for co-existing with big and fast change in the Anthropocene are as vital as any infrastructural, scientific, and preparatory or adaptive actions. They generate new sensations and meanings – potentials that open the future to new actions and arrangements – even as the future seems to be closing down.

Subatlantic [Fig. 5]
Ursula Biemann
Appealing simultaneously to the various meanings of the term 'Subatlantic' – a climatic phase beginning 2500 years ago, as well as the submerged regions of the Atlantic – *Subatlantic* immerses its camera deep in oceanic waters to ponder the entanglements of geological time with that of human history. As the voice-over narrates the accounts of a female scientist traversing the pan-generational timescales of the Subatlantic, we navigate through the mental and ecological dimensions of the melting Arctic icescapes. In this narrative, thoughts materialise. They reconfigure to engage the changing ecology, they merge with frozen methane, become part of weather events, unhinge new maritime cohabitations. This speculative video-essay is as much about the physical and natural environment as it is about the psychic space we inhabit, and of which we are part, because the transformations occurring in the atmosphere affect not only the physical but also the mental climate on earth. *Subatlantic* interweaves vast cinematic landscapes with documentary footage, science fiction poetry and academic findings to narrate a changing planetary reality.

Post Rock: Summerhouse Prototype [Fig. 6]
Meredith Miller and Thom Moran
This prototype is part of an ongoing research initiative called *Post Rock*. Through hands-on material experimentation and design speculation, this research anticipates a future material economy where waste plastic becomes a valued source for building. *Post Rock* captures a recent geological phenomenon where plastic waste in oceans and coastal areas are fusing with sand, rock, and other inorganic substances. Scientists have established a new classification for this stone, identifying them as 'plastiglomerate'. Plastiglomerate is a post-natural product of human and geological processes. Claiming this post-natural rock as a new building material, we design fabrication methods that emulate the geological processes behind its formation. The research is both a technical investigation into thermocasting tectonic elements and a design speculation on the aesthetic potential of the material. Just as each plastiglomerate rock's unique and heterogeneous surface results from the particular geography where it was formed, *Post Rock* visually communicates a sense of territory through its component materials.

Cyborg Ecologies [Fig. 7]
Bradley Cantrell
Approximately 40% of people across the globe are living within 100 kilometers of coastal and riverine environments. This means that three-quarters of the world's mega-cities and critical infrastructure are situated next to the ocean and will be required to adapt to fluctuating sea levels over the next century. This adaptation will be a monumental task, requiring huge adjustments in the physical

Fig. 6

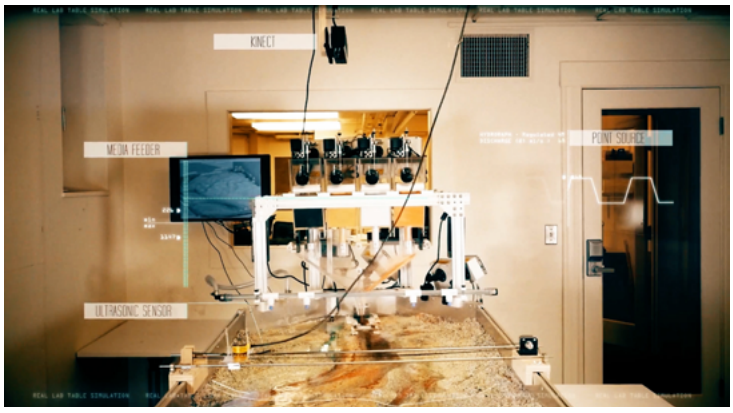

Fig. 7

Fig. 8

Fig. 6: Meredith Miller and Thom Moran, *Post Rock: Summerhouse Prototype* (2016). Plastic multimedia, 90cm x 90cm x 106cm. Photo (detail): Peter Smith Photography.

Fig. 7: Bradley Cantrell, *Cyborg Ecologies* (2014-2017). Still from video, 5:04min.

Fig. 8: Lisa Hirmer, *Dirt Piles* (2011). Print on paper, 74cm x 54cm.

location of cities and the construction of new forms of barriers and mediations through levees, sea walls, and control structures. The research outlined in this presentation posits that the energy embodied in the hydrological systems that build coastal lands, can be choreographed to mitigate the effects of sea level rise. The research focuses on sediment transport, the suspension and movement of sediment within the water column and how small modifications to the water system can be used to construct new land. This research connects global sensing systems, machine intelligence, and simulation to the construction of coastal environments, particularly how remote and embedded sensing can be used to choreograph the real-time construction of coastal landscapes through micro-interventions.

Dirt Piles [Fig. 8]
Lisa Hirmer
The law of conservation of mass states that matter can neither be created nor destroyed. It can only be rearranged. This means that the by-product of a certain kind of place – sprawling, well-drained parking lots, ribbons of level suburban backyards, and topographically featureless industrial land – is extra material, dirt mostly, that needs to be rearranged and put somewhere. Neither useless nor particularly valued, it's heaped into a pile somewhere out of the way until a use for it is found or it can be moved. Sometimes these dirt piles are ephemeral, remaining for only a short period of time during construction, but often they remain, at the unfinished end of a suburban street, or looming behind new storage units, perhaps dissipating from consciousness but never from physical presence. The dirt pile is both relic of the landscape that used to be and a monument to the act that changed it. It is a measure of the forces of technology, industry, culture and economy that make large scale reshaping of the terrain possible, profitable and desirable. It could be understood as the reciprocal form of how and what we build. The dirt pile also reveals the fickleness of the earth's surface. It has become something that is infinitely malleable, something that can be opened up, turned inside out, rifled through and piled up.

LA Recalculated [Fig. 9]
Smout Allen (Laura Allen and Mark Smout)
LA Recalculated speculates on Los Angeles's future incarnations and reinstates LA as a site of astronomical observations and scientific experiments. Its natural history, shifting alignments and unstable ground conditions reinforce the proposition that Los Angeles is a place of both seismic risk and existential uncertainty, lending further metaphoric and even philosophical importance to the role architecture can play in such a landscape. Seen through the lens of this expanded context, Los Angeles becomes an archipelago of scientific instruments often realised at the scale of urban infrastructure: densely inhabited, with one eye on the stars, sliding out of alignment with itself, and jostled from below with seismic tides. The endless jostling of the city, whether due to tectonic activity or to LA's relentless cycles of demolition and construction, can be tapped as a new source of renewable energy. Vast flywheels convert seismic disturbance into future power, spinning beneath generation facilities built throughout the city's sprawl.

The Birds and the Bees [Fig. 10]
Harrison Atelier (Ariane Lourie Harrison and Seth Harrison)
Why limit architecture to building for one species? Harrison Atelier's *The Birds and the Bees* proposes a space of cohabitation for pollinators and humans. The wall surface is an important site: can it be used more opportunistically for a greater number of inhabitants? We think yes and have been working on a paneling system that can be applied to exterior wall surfaces. Cast-concrete modular wall panels propose combinations of form and aperture sizes to create new dwelling typologies for local cavity-nesting birds. Panels at the base of a building have smaller apertures designed for solitary bees,

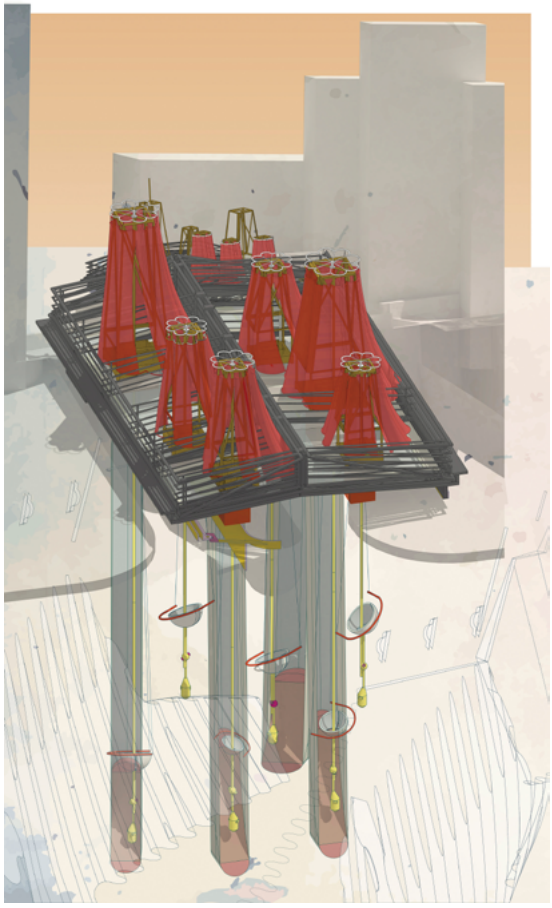

Fig. 9

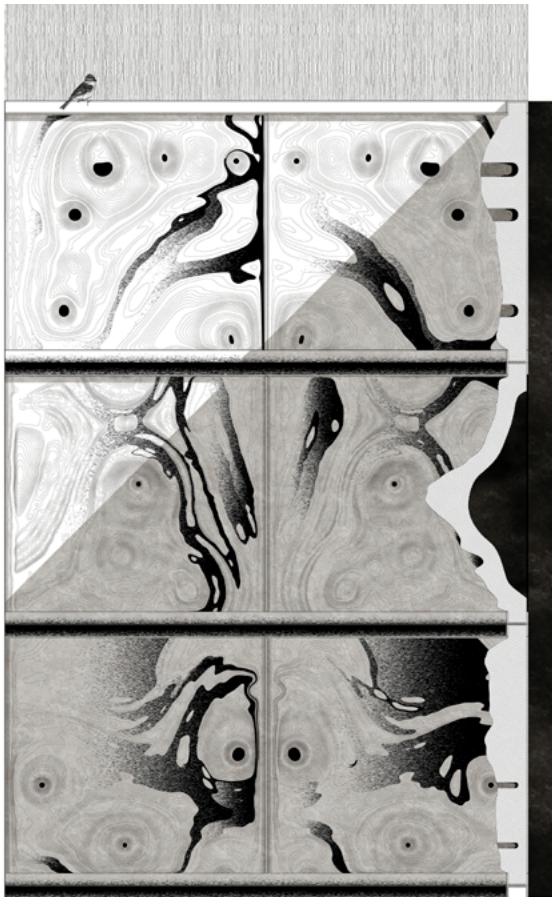

Fig. 10

Fig. 9: Smout Allen, *LA Recalculated* (2015). Print on paper, 47cm x 76cm.

Fig. 10: Harrison Atelier, *The Birds and the Bees* (2016). Print on paper, 43cm x 69cm.

which stand among the most valuable pollinators. A suite of drawings, moulds, and prototypes were displayed at CR-10 in Linlithgo, NY in 2016 in an installation tracing the development of panels for a multi-species façade system. This paneling system was displayed in a freestanding pavilion at the Clermont Historic Site in Germantown, NY in 2015 and is currently under development for a pavilion in a Hudson Valley ecological art park. *The Birds and the Bees* is part of a series of speculative building projects that explore human/non-human species cohabitation in the Anthropocene period.

Concert for Plants by Plants [Fig. 11]
Lindsey french

Can we consider practices where we rearrange traditional hierarchies, querying power in such a way that we value the marginal, become comfortable with ambiguity, imagine an alternative past, and maybe, be with the pain of realising ourselves as the aggressor? Are there postcolonial practices we might begin to embody by reconsidering the ways in which we treat the other? The landscape is a projection surface, the landscape fades into the background, is the background. The landscape is what we investigate when we want to understand cultural and biological histories. It is where human and nonhuman meet. It is here that we can develop reparative practices. Proposal: go willingly, thrillingly into exposure. Proposal: consider the sensation not only yours, but a shared sensation; consider the sensation a link that implicates both you and the other. Allow yourself to consider yourself the other. Proposal: find solidarity in objecthood. Proposal: seek quiet, repeated, cumulative conversations. Proposal: consider your body the words of a conversation. Have that conversation often. Proposal: relate to an other sensually. Notice your sensation in the fallout. Proposal: don't prepare yourself. Proposal: resist instrumentalisation every day. Proposal: create a singular experience through increased exposure. Consider your experience not only yours but shared, a link between you, your body and another body across time and material. By complicating simple hierarchies, by considering ourselves as the environment to a plant, might we be able to imagine the past having gone differently, and position ourselves differently in the future so that rather than enact old traumas or re-inscribe old scripts, we might re-enact old possibilities.[10]

Conclusion

If there is a sensibility that binds the works gathered here it might be characterised by the following qualities. There are no compositional strata, no regulating lines, no geometric or other proportional systems governing their forms. Their edges are rough, their limits are unclear, shapes are soft and surfaces unfinished. Despite this informality, nothing is natural and nothing has been left to chance. This purposefully ambiguous aesthetic speaks to the liberating potential of art and design to be at once of the world and of the world-yet-to-be; they are what Jacques Rancière calls the alternative 'distributions of the sensible' necessary for envisioning and enacting heretofore unimagined physical and social realities.[11] Hence, the forms and environments presented in *Ambiguous Territory* might be seen as fundamentally uncanny. As such, they serve to remind us that we live in a world isolated from its own nature in no small measure via the processes of agrilogistics. This unsettled world is no longer experienced as a home but rather, an 'unhomely home'.[12] Through various forms of material and philosophical estrangement, then, the works gathered here seek in part to function as instruments of defamiliarisation, not unlike the uncanny itself, engendering new ways of seeing and knowing. In this sense, they might be seen as functional, in terms of producing critical awareness through visual forms of communication. That is, they seek to visualise a world in which previously held categories and distinctions – for example between humans and animals, or living and non-living beings – have been displaced and thus made strange. And while such forms and environments of displacement have become more visible and thus

Fig. 11: Lindsey french, *Concert for Plants by Plants* (2012/2017). Still from video, 6:30min.

knowable in the world itself, particularly through the increasingly tangible effects of climate change, they remain abstract enough for continued repression and denial at both individual and collective scales. It is here that the work presented in *Ambiguous Territory* renders undeniably visible and thus recognisable, in all of its alienating and potentially anxiety-inducing ways, the contemporary haunting of a planet estranged from itself.

Notes

Ambiguous Territory, Architecture Landscape and the Postnatural has been exhibited at: University of Michigan Taubman College of Architecture and Urban Planning, September 27 – October 18 2017; University of Virginia Elmaleh Gallery, September 4 – October 6 2018; Pratt Manhattan Gallery, December 7 2018 – February 7 2019.

1. Jacques Derrida, 'Plato's Pharmacy', in *Disseminations*, trans. Barbara Johnson (Chicago: University of Chicago Press, 1981), 65–119; Gregory Bateson, 'The Cybernetics of "Self": A Theory of Alcoholism' *Psychiatry* 34 (1971): 1–18.
2. In *Dark Ecology* (Columbia University Press, 2016), Timothy Morton deploys the neologism *agrilogistics*. The term is also generally deployed as agri-logistics or agro-logistics, e.g., the World Bank's recent position note defines agro-logistics as such: 'Agro-Logistics can be seen as a sub-discipline of Logistics. An agro-food supply chain comprises organizations that are responsible for the production (farmers), processing (industry) and distribution (service providers and traders) of vegetable or animal-based products.' Jack G.A.J. van der Vorst and Joost Snels, *Multi-Donor Trust Fund for Sustainable Logistics (MDTF–SL) Position Note on Agro-Logistics* (Washington, DC: World Bank Group, 2014), http://documents.worldbank.org. Morton's formulation extends to a larger theoretical position that he suggests is at the core of humans' continuously deployed control regimes vis-à-vis the environment.
3. Will Steffen, Jacques Grinevald, Paul Crutzen, and John McNeill, 'The Anthropocene: conceptual and historical perspectives'*, Philosophical Transactions of the Royal Society,* 369 (2011): 845. One theory of the Anthropocene ties it to the advent of agriculture. The article states: 'This hypothesis for the beginning of the Anthropocene argues that two agriculture-related events – the clearing of forests and conversion of land to cropping about 8000 years ago and the development of irrigated rice cultivation about 5000 years ago – emitted enough CO2 and methane (CH4), respectively, to the atmosphere to prevent the initiation of the next ice age. The hypothesis is that the early forest clearing reversed a downward trend in CO2 concentration that had been established in the Holocene by increasing CO2 concentration by 5–10 ppm. A recent model-based analysis claims that these modest increases in greenhouse gas concentrations were enough to trigger natural ocean feedbacks in the climate system strong enough to raise global mean temperature significantly and release additional CO2 to the atmosphere.' (p. 847).
4. From Bruce D. Smith, 'The Onset of the Anthropocene', *Anthropocene* 4 (December 2013): 4–6. 'Although evidence for this global intensification of human niche construction efforts in the early Holocene is limited … one result of increased human manipulation of biotic communities does stand out – the appearance of domesticated plants and animals. These sustained, multi-generation human efforts at manipulating and increasing the abundance of economically important species in resource-rich environments during the Early Holocene (ca. 11,000–9000 BP) provided the general co-evolutionary context within which human societies world-wide brought a select set of pre-adapted species of plants and animals under domestication. These domesticates in turn have provided the lever with which we have transformed much of the earth into agricultural landscapes that feed an ever increasing global population, and it is this domestication process … that provides the archeological signature for major human

manipulation of terrestrial ecosystems, and the onset of the Anthropocene.' (p. 5).

5. Steffen et al., 'The Anthropocene', 845.
6. Ursula K. Le Guin, Keynote 5 August 2014 online at: https://vimeo.com
7. Donna Haraway, *Staying With the Trouble, Making Kin in the Chthulucene* (Durham NC: Duke University Press, 2016).
8. J. G. Ballard, *The Drowned World*, (New York & London: WW Norton, 2012 [1962]), 25.
9. William E. Connolly, *Politics and Ambiguity* (Madison: University of Wisconsin Press, 1987).
10. Transcribed from presentation by Lindsey french at the Ambiguous Territory Symposium, October 6 2017.
11. Jacques Rancière,'The Aesthetic Dimension: Aesthetics, Politics, Knowledge', *Critical Inquiry 36*, No. 1 (Autumn 2009): 1; Félix Guattari, 'The Object of Ecosophy' in *Chaosmosis* (Bloomington: University of Indiana Press, 1995).
12. Anthony Vidler, *The Architectural Uncanny: Essays in the Modern Unhomely* (Cambridge, MA: MIT Press, 1992), 13. Vidler explores the aesthetic quality of the uncanny, along with its various discourses of estrangement and defamiliarisation, in the context of experimental architecture in the 1980's. In the context of the work presented in *Ambiguous Territory*, we are interested in what might be thought of as a new iteration of the uncanny for the twenty-first century, what might be thought of as the environmental uncanny.

Biographies

Cathryn Dwyre, Chris Perry, David Salomon, and Kathy Velikov are co-curators of the exhibition and symposium Ambiguous Territory and co-editors of a forthcoming publication through Actar.

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Footprint is a peer-reviewed journal presenting academic research in the field of architecture theory. The journal encourages the study of architecture and the urban environment as a means of comprehending culture and society, and as a tool for relating them to shifting ideological doctrines and philosophical ideas. The journal promotes the creation and development – or revision – of conceptual frameworks and methods of inquiry. The journal is engaged in creating a body of critical and reflexive texts with a breadth and depth of thought which would enrich the architecture discipline and produce new knowledge, conceptual methodologies and original understandings.

In this issue, the following papers were peer-reviewed: 'The Floor Is Not the Ground: Ecologies of Interruptions in Transportation Infrastructure'; 'The Zone in Reverse: Logistical Power and the Gaza Blockade'; 'ICEBOX: The Logistics of Detention'; 'Colonial and Postcolonial Logistics'; 'Blankness: The Architectural Void of North Sea Energy Logistics'.

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