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# Tangling a bi-oceanic corridor

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Among the many epistemological uncertainties surrounding the world's urban condition, one hypothesis is that logistics is a globally urbanising force. Global trade, in fact, typically relies upon a vast set of interconnected sites, subjects and technologies: logistics corridors and areas, stocking and fulfilment centres, airports, industrial ports, containers, cranes, heavy-duty vehicles, submarine cables, data centres and energy supply networks. Logistics and its spatialities might offer potentially renewed interpretive keys to those seeking to retrace a planetary urban condition beyond cities as its obsolete matrices (Brenner & Schmid, 2014, 2015), as the geographies of circulating commodities invite us once more to de-centre perspectives on the urban, questioning its presence from unexpected sites (Roy, 2009, 2016; Schmid, 2018).

The commodity chain construct corresponds to a body of work which has become both robust and differentiated since its origins in world-systems theory (Hopkins & Wallerstein, 1977). Through distinct terminologies, this literature has been focusing on issues of chain governance, inter-firm networks and industrial upgrading (Bair, 2005), while the Global Production Networks framework has brought a distinctively relational and broader perspective (Coe, Dicken, & Hess, 2008). Despite respective distinctions, these diverse strands ultimately adhere to the initial programme: "[to] trace back the set of inputs that culminated in this item — the prior transformations, the raw materials, the transportation mechanisms, the labor input into each of the material processes, the food inputs into the labor. This linked set of processes we call a commodity chain" (Hopkins & Wallerstein, 1977, p. 128). By following a single object we come to uncover an interactive mesh made of interdependent subjects, sites and practices. Being rooted in economic geography and international business, though, this rich literature has only sporadically engaged with questions of urban space and its constitutive processes. When it did, it seemed to be more strongly concerned with factoring in urban space in order to advance knowledge about commodity chains rather than employing the commodity chain construct as an epistemological inquiry into urban space. And yet, as a dynamic and relational concept, commodity chains and production networks propose a direct invitation to trace global patterns of urbanisation connecting diverse urban formations.

In this short essay I want to accept this invitation and initiate a reflection from an ex-centric site, 'following things' across multiple sites (Cook, 2004) along the Chilean-Argentinian section of a bi-oceanic corridor hosting the first stretch of a li-ion supply chain. Li-ion batteries are an indicative, globally diffused product sustaining the world's transition away from fossil fuels and here is where the majority of the world's lithium is extracted, refined and shipped overseas. Lithium itself is not the question here, but its geographies open up a relational and multi-sited ethnographic practice (Desmond, 2014; Marcus, 1995) allowing us to bring 'urban' questions to life outside of their usual

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site — cities. By exploring this logistics territory I want to propose an alternative reading, overcoming the linear, hydraulic and self-contained image of the corridor towards more habilitating horizons. These sites are 'tangles': dynamic, interrelated, negotiated and contested patterns of urban fabric.

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Bi-oceanic corridors are a fashionable formula across Latin America, located at different latitudes according to the usual floating of international trade. The one I find myself in consists of a thick network

of roads, waterways, railways, high-voltage power lines (along with their thermal, hydroelectric and nuclear power plants), mines, logistics areas and other spatial features.

The corridor crosses for more than 2.600 km along its West-East axis between the 20° and 30° South parallels. It is proposed as one of South America's largest infrastructural projects with the goal of economically and logistically

*The Latin American stretch of the li-ion commodity chain, relies itself upon a diverse number of spaces: underground water bodies, pools of multi-species labour, large-scale extractivist plans and transportation networks*

integrating several sub-regional entities across four nation states, facilitating import/export flows towards Asian regions through the Pacific Ocean. "The Desert Panama Canal," an expression apparently coined by Chinese interests in the area, its largely primary produce and huge market demand.

Lithium is found here in underground waters lying below so-called *salares* — salt flats located at high altitudes in the Andean range. These underground spaces are the home of lithium-rich brines which are pumped into evaporation ponds for concentration and lithium carbonate production. Indigenous people who have inhabited the Puna plateau for millennia repeatedly highlight the two fundamental behaviours of water in their homeland: it travels downwards through gravity and it seeks to escape towards the sun as soon as possible. This understanding highlights how, due to harsh climatic conditions, underground water bodies are a vital space supporting many species in this arid plateau, including humans. At the origin of the li-ion production network, these underground spaces are the most present political-ecological knot tying together a wide range of life forms by issues of water consumption and pollution. Mining companies' billboards claim that consumption is 'much less intensive than standard agricultural practices,' while at the same time refusing to present any quantitative or qualitative data to support this claim. Local activists and transnational collectives struggle to demonstrate the potentially immense ecological disaster being produced by this activity: endless piles of waste minerals are left exposed to high winds travelling many kilometres with unknown effects, water levels are lower everyday and illness frequency is suspiciously growing. And yet, no data is available to substantiate these claims either. Indigenous people keep practicing the *challa* in order to ask Pachamama — the ever-present deity in Quechua/Aymara culture sustaining life on Earth — abundant waters and a rich harvest for the coming times. Most of the local scientists, potentially capable of generating third-party data, largely avoid this socio-natural trouble. The result is that at present day state there is no scientific knowledge circa the hydrogeological functioning of these deposits: economic agreements, regulatory acts, political campaigns, financial calculations and entire spatial plans are constructed around a salar which has been defined 'imaginary,' its underground chambers emerging as an oversize question mark. A hollow tangle — whose inner features are invisible to the eyes — but still a tangle tying many species and spaces together. Underground water in this progressively urbanising scenario, imagined as a constantly flowing and moving element, ties together extraction fields, animal and plant biomes and traditional agricultural spaces.

Let our gaze emerge together with the lithium brine being pumped through geological layers and appearing above the salty surface and we are confronted with a similarly entangled scenario: which

labour inputs come to generate this stretch of extractive activity? Which socio-spatial relations do they engender? Wild subcontracting is the norm, partly because the complex geographical and climatic conditions hamper vertical integration and render local resources cheaper, partly because salaried labour is the bargaining chip with local communities. Native people are in fact entitled with the property of the land they occupy, while the underground is State-owned. Mining companies need then to secure permission from them in order to reach the much sought-after underground basins and the resources they contain. A preferential lane is established for those Puna inhabitants who apply as mining workers, yet their participation is evidently limited to the lowest-skilled section of the necessary labour as their access to higher studies remains very limited. Mines give labour to other species too, as companies are said to hire watchdogs in order to chase flamingos resting in their crystalline evaporation ponds. In addition to this primary labour market, a secondary one is induced as locals are encouraged (if not specifically trained) to constitute privately-owned SMEs providing auxiliary services to the mining enterprises – accommodating workers in facilities that need to be built and maintained, feeding them in comedores and transporting them in minivans between the village and the mine. This transformation entails the replenishment of certain sites and the depopulation of certain others: substituted by formal salaried employment, farming spaces and environmental practices become obsolescent and entire socio-natural relations are rebalanced.

Geographies of things invite us to exceed the local or sub-regional scale through a progressive zoom out, calling into question the larger infrastructural networks supporting this extractive industry. How are material, energy and labour inputs supplied and transported here? Where from? The Argentinian Puna is currently at the centre of a vast urbanising programme explicitly relying upon the extraction of minerals, hydrocarbons and renewables and their subsequent trade and distribution. This programme is presented by local planning authorities as a highly interactive system hinged upon a number of 'urban' sites: two lithium mines, a free trade zone, South America's largest solar field and some newly traced roads. The construction process of the Cauchari solar field is emblematic, its sheer scale offering a measure of the material cluttering and the extraterritorial implications underpinning the overall plan: financed by the Export–Import Bank of China (Exim), 800 hectares of land have been emptied out and levelled in order to install roughly 6,000 tonnes of almost entirely Chinese materials, such an unusual volume in a compressed time frame that a special customs area has been moved to site.

The physical spine of this extractivist urban tangle is the only paved road crossing the plateau between Argentina and Chile. Large trucks come and go on a daily basis transporting imported cars, clothes and other mundane goods, minerals, hydrocarbons, drinking water. These same trucks can be found untidily stationing in front of the port entrance, many kilometres ahead, while drivers wait for permission to unload their cargo. They travel from many of the nearby mines and among staggering quantities of copper an increasing volume of lithium carbonate can be spotted. Metal, wood and fabric shacks have popped up in front of the entrance as women from the nearby village cater to these drivers waiting in line.

Port terminals are another intricate tangle within this spatially interwoven and socially negotiated system of coordination. They are the archetypical platform typology, apparently acting as smooth distributive spaces, yet their functioning is much less linear than this designation suggests. Port managers and representatives struggle to attract economic activity within their premises with hard research and imaginative labour, for example by selecting the import of proper commodities, the most attractive shipping routes or innovative distribution and stocking tactics. The import of sodium carbonate, in the Latin American case, is a productive lead for investigating the export of lithium carbonate: the first is a fundamental element in the production of the second and lithium mining companies seek to optimise their transport practices by importing one and exporting the other from

the same site. Every empty container mobilised along a route is a sheer cost and port authorities seek to capture the profits coming from this economic necessity. Ports are an interwoven ensemble of humans and non-humans — their system of cranes, containers, stocking innovations and mobile workforce spatialising the ability to negotiate a volatile non-linear traffic of transcontinental commodity flows. The empty bulk carriers wait their turn to load cargo along the coast of Antofagasta, facing the informal *villas* perched on the arid mountain sides — built and inhabited by the many Colombians who travel here to find their place in the low-skill low-pay labour market sustaining this booming mining and logistics city.

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In striking similarities with the concept of La Pachamama, a tangle is an untidy and potentially limitless set of interconnections which invites to a non-linear negotiation. Not an easy one, as tangles typically respond unpredictably to given inputs: pulling one thread might imply disengaging it or overtightening a knot somewhere else. Tangle-like thinking across the bi-oceanic corridor means transcending it as a unitary socio-spatial stretch and instead being invited to follow the constantly escaping flows that come to constitute it. While it is tempting to read operational landscapes as 'pure' — highly mechanised and strictly monocultural — this lens reveals an overwhelming interconnection of elements populating these otherwise inanimate territories. Underground water bodies, geological forces, flamingos, agricultural spaces, indigenous activists, family economies, solar fields, roadsides, port terminals and informal settlements are knitted together in an intricate tangle of metabolic flows. What is urban, then, and what is not?

Observing logistics as an urbanising force through its entanglements has implications whose full depth would be the subject of another essay. To me, lively geographies of things across commodity chains can help us break the spell of global capitalist urbanisation and its dead (and deadly) geographies along lines of interdependence, negotiation and contestation. A deep reassertion of entangled thinking is a precious companion in knotting other worlds together through the rifts and invisible corners of the uneven fabric of the global urban.

## References

- Bair, J. (2005). Global capitalism and commodity chains: Looking back, going forward. *Competition & Change*, 9(2), pp. 153–180.
- Brenner, N., & Schmid, C. (2014). The 'urban age' in question. *International Journal of Urban and Regional Research*, 38(3), pp. 731–755.
- Brenner, N., & Schmid, C. (2015). Towards a new epistemology of the urban? *City*, 19(2–3), pp. 151–182.
- Coe, N., Dicken, P., & Hess, M. (2008). Global production networks: Realizing the potential. *Journal of Economic Geography*, 8(3), pp. 271–295.
- Cook, I. (2004). Follow the thing: Papaya. *Antipode*, 36(4), pp. 642–664.
- Desmond, M. (2014). Relational ethnography. *Theory and Society*, 43(5), pp. 547–579.
- Hopkins, T. K., & Wallerstein, I. (1977). Patterns of development of the modern world-system. *Review*, (1), pp. 111–145.
- Marcus, G. E. (1995). Ethnography in/of the world system: The emergence of multi-sited ethnography. *Annual review of anthropology*, 24(1), pp. 95–117.
- Roy, A. (2009). The 21st-century metropolis: New geographies of theory. *Regional Studies*, 43(6), pp. 819–830.
- Roy, A. (2016). What is urban about critical urban theory? *Urban Geography*, 37(6), pp. 810–823.
- Schmid, C. (2018). Journeys through planetary urbanization: Decentering perspectives on the urban. *Environment and Planning D: Society and Space*.