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Book Review

Extracting the Andes

- Reviews section -

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Planetary Mine: Territories of Extraction Under Late Capitalism by Martín Arboleda, London: Verso 2020.

Narrowly winding down the coast of the Pacific Ocean, to the tip of South America, Chile is the biggest supplier of copper to the world market. Its Andean ranges also contain massive lithium deposits – the key ingredient in battery power. No lithium, no iPhone. Most mining takes place in the north of the country, in the region of the Atacama Desert, with the city of Antofagasta acting as the urban hub of export-oriented extractive activity. Copper gleaned from mines nearby constitute 30 percent of Chile's exports, while the lithium pooled and refined in adjoining Salar del Carmen amounts to 130 tons per year.

Mining supply chains originating in Chile expand outward across the Pacific's labyrinthine maritime trade routes, and into the equally complex urban-industrial networks at the foundations of China's rise. If, in the 1970s, 80 percent of global trade was made up of transatlantic shipping, by 2013 that figure had fallen to 40 percent, with the Pacific Ocean becoming the central corridor for world trade. Already by 1995, China had become the world's dominant steel producer, goading an extraordinary demand for raw material imports, and the attendant development of an unparalleled maritime fleet. The minerals extracted from mines like those in Chile reappear as tens of thousands of skyscrapers lining the cityscapes of China's rapidly expanding conurbations, highway and railway infrastructures, industrial inputs, and consumer products.

The World, the Machine, and Everyday Labor

Martín Arboleda's exceptionally ambitious *Planetary Mine*, attempts to connect the abstract unfolding of a process of global capital accumulation linking Chile and China across the world market, together with the concrete, sensuous, quotidian realities of labor, territory, and urban life on either end of that abstract flow.

One backdrop to story is the accelerating pace of automation. While the tendency for increase in the ratio of automated to living labor – or the organic composition of capital – dates back to much earlier stages of the capitalist mode of production, the twenty-first century has brought with it a qualitative leap. Artificial intelligence, robotics, and big data today underpin processes of mineral extraction, enabling the twenty-four-seven activities of completely robotized trucks, shovels, and drills.

Advances in systems of geospatial information and geological surveying capacities have made access to low-grade ore bodies profitable, either for the first time, through precise representations of subsurface mineral deposits, or once again, in the case of abandoned mines long thought to have been utterly sapped of their riches. Engineered microorganisms are increasingly used to breakdown ores impervious to the whims of older technologies. Simultaneous developments in logistics have created incentives for integrated systems across sites of extraction, processing, and smelting, through to ports and far-flung shipping routes.

As China transformed into the manufacturing centre of global accumulation, its commercial ties to Latin America expanded at a remarkable rate, with punctuated surges of intensity. In 2009, for example, trade between China and Latin America was valued at only $15 billion, whereas barely two years later that figure had reached $200 billion. Chile's metal exports to China rose from $460 million in 2001 to $11.1 billion in 2011, correspondent with a super-cycle of high commodity prices in the world market, alongside less-appreciated developments in the

mechanization of the mining industry.

Underlying Arboleda's approach is the notion that the planetary mine is irreducible to a singular site of extraction; instead, it ought to be treated as a "dense network of territorial infrastructures and spatial technologies vastly dispersed across space," combining processes of production and exchange across the complex apparatuses and geographies of the circulatory system of extractive capital. The space of extraction in question, then, is never merely a copper mine in northern Chile, say, but also its intricate links to Chile's logistical system of highway grids and nodal ports on the Pacific coast, transoceanic trade routes, geographies of labor on either side of the Pacific, hierarchical supply chains, new forms of state power and imperialism, and the mediation of these ties by novel developments in finance. The planetary mine consists of this entire geography of extraction, from primary-commodity production in the Andean plateaus of Chile to the advanced manufacturing destinations of China.

Global Determination and Form-Analysis

The world market, for Arboleda, is the a priori level of analysis, understood as more than simply the sum of national economies. The world market is the terrain on which production and exchange can ultimately be comprehended as a totality composed of all its distinct moments. It is at this level where, through innumerable concrete acts of production and exchange, the total surplus value of society is determined, and only thereafter distributed across individual capitals and states.

National economies, from this perspective, are conceived as political "modes of existence" of the global economy. In this sense, the world market is not a structure standing above and determining national economies and human behaviour and experience therein, but rather expresses "the radical interdependence of social and ecological existence under capitalism." The national state does not disappear in this setting – far from it – but Arboleda is nonetheless keen to emphasize the distinction between state-forms and their capitalist content, the underlying class antagonism of the latter being "essentially international" rather than bound up within the political confines of the national territories. The objective, then, is to delineate "the properly global content of resource imperialism and of the bourgeois state-form in the context of contemporary geographies of extraction."

Planetary Mine is explicitly written and structured in the tradition of form-analysis Marxism. By Arboleda's reckoning this perspective envelops thinkers as diverse as Simon Clarke and Werner Bonefeld of the school of Open Marxism, Moishe Postone – author of *Time, Labor, and Social Domination*, which Arboleda suggests "might be as important for the twenty-first century as Lukács's *History and Class Consciousness* was for the twentieth" – Italians Riccardo Bellofiore and Tommaso Redolfi Riva, as well as Argentinians Juan Iñigo Carrera, Guido Starosta, and Enrique Dussel. Iñigo Carrera and Starosta are aligned with the Centro para la Investigación como Crítica Práctica in Buenos Aires, in which Iñigo Carrera acts as mentor to a small but influential cohort of theoreticians with a very particular reading of Marx. Dussel, based in Mexico City since his exile from Argentina in 1975, is one of Latin America's preeminent interpreters of Marx and a heterodox theorist within the dependency school.

"Broadly understood," Arboleda contends, "these traditions frame the Marxian critique of political economy as an interrogation of the alienated forms of social mediation that are historically specific to modern, capitalist society… these currents have in common [together also with the German school of Neue Marx-Lektüre] the fact that they reject the methodological separation of politics and economics typical of structural variants of Marxism and emphasize Marx's treatment of alienated labor, fetishization, and alien objectivity in his mature work."

Arboleda seeks to connect the dual emphasis in form-analysis on "interrogating sensuous practice" – his ethnographic investigations into sites of extraction in Chile, and the lineaments of production, logistics, and exchange

tying them to manufacturing destinations in China – and grasping “the manifestations of the mystifying forms, the immanent rhythms, and the inner contradictions of the capitalist economy and bourgeois society in its totality” – determined ultimately at the level of the world market. Form-analysis focuses on the forms or modes of existence of capital – “money, commodities, technical artifacts, labor, and the state” – rather than, in competing Marxist traditions, on “structures.” The notion is that such a methodology allows one to “supersede subject-object dualism, and henceforth capture the universal content that is expressed through the unfolding of concrete practices and things.”

Attentiveness to the laboring bodies and evolving technologies and machineries within the planetary mine allows Arboleda to reveal “how human bodies become possessed (and often obliterated) by uncanny forces and nonhuman objects become animated with powers over life and death.” He places stress on class antagonisms at the heart of “contemporary sociotechnical systems and ecologies,” and, at the same time, searches to show “the possibilities of the current industrial era for collectively imagining and producing a different kind of modernity.”

Imperial Power

Arboleda’s theorization of imperialism starts from the sensible premise that the classical Marxist interventions on this theme – especially those of Luxemburg, Lenin, and Hilferding – were designed to address a substantively different period of capitalism than the one we are living through presently. For the first time in history, capitalism is truly planetary in scale, and thus, unlike the early twentieth century, imperialism is not defined by the incorporation by dominant Western powers of a noncapitalist outside through “means of military conquest, pillage, and colonial domination.” Whereas some critical theorists have suggested that this situation has spelled the end of imperialism per se, Arboleda argues that imperial practices have merely metamorphosed into novel forms and configurations. Because of the universalization of the capitalist world market, further territorial expansion is foreclosed, meaning that the emphasis of imperialism has shifted “from spatial extension to intensification; hence the relevance of Marx’s distinction between the formal and real subsumption of labor to capital.”

Arboleda accepts much of the account of the world-systems perspective – Immanuel Wallerstein and Giovanni Arrighi, above all, but also Jason W. Moore – regarding the interaction of resource frontiers, technological revolutions, and hegemonic powers over the longue durée. But he departs from their conceptualization of the last several decades, and particularly Arrighi’s anticipation of the hegemonic ascent of China. Gold and silver from the Americas, then, underpinned the Habsburg monarchies in the Iberian Peninsula and monetary system of the Italian city-states of Venice and Genoa. Maritime trade of timber and peat played a similar role for Dutch financial power in the seventeenth century. Guano and rubber from South America were subsequently essential to the farms and factories of the British Empire, as was coal power for the steam-engine. US domination has likewise rested in part on the dynamics of vertically integrated oil frontiers.

However, according to Arboleda such eras of successive hegemons and associated resource frontiers have drawn to a close. The extraordinary industrial upgrading of Japan, South Korea, Taiwan, and Singapore, and later, most dramatically, of China in the late twentieth century, has fundamentally transformed the old international division of labor through the modularization of manufacturing. As a consequence, successive waves of hegemonic transition have been fundamentally altered. For Arboleda, the dialectically bound fragments of the planetary mine – pipes and cables of megacities, electronic-manufacturing systems, cargo vessels, mines, and complex geographies of labor – “warrant a thorough rethinking of the very nature of capitalist imperialism, political authority, and the spatial architecture of the world market.” China, in this account, has not become, nor is it set to become, “the new imperial or ‘hegemonic’ power of the global economy.” The qualitative internationalization of the Chinese state “in no way resembles anything close to the ‘hegemons’ that led the systemic cycles of accumulation” such as, for example, in Arrighi’s classic formulation. We know this in part because “China’s global presence has … been defined not by its military or even its political emissaries, but by its supply chains.”

This isn't to imply, Arboleda is quick to reiterate, the absence of violent forms of imperialism, or to invoke some sort of pure economic unfolding of the law of value across the globe through the capillaries of commodity production, circulation, and consumption. Indeed, "the violent dislocations spurred by the world market are much more than the result of a mere economic mediation, and this fact emerges with full clarity in the minds of the oppressed." They are the ones who face "the machinery, police trucks, and private security personnel – often working in connivance with death squads – swarming around extraction sites" in Latin America. These agents of violence, for Arboleda, are "the material embodiment of a more advanced stage of the same system of capitalist domination sedimented in centuries of racialized violence, enslavement, and expulsion."

If the state-centrism of most accounts of imperialism needs to be abandoned, on this view, imperialism as a phenomenon persists in the contemporary world. Here is Arboleda's first attempt to define it succinctly: "this book proposes to understand imperialism as one of the phenomenal forms in which global value relations assert themselves." This, in my view, is so general as to almost get us no where. It is impossible to decipher a difference here between Arboleda's understanding of imperialism and his understanding of nation-states – they are each but two phenomenal forms of global value relations, if at different scales.

Later, he states that imperialism should be "understood as the experiential basis that underpins the subsumption of the constitutive outside of capital to the process of accumulation," the "corporeal phenomenology of a process whose essential content is to be found in the telos of the value form: the production of the free market through the exploitation of the laboring class as a pulsing, breathing, planetary organism." Arguably, this takes us a little further, but not by much. Such formulations are meant to distinguish his account from "dominant readings" which ostensibly conceive of capitalist imperialism as "autonomously determined by the political relations of the nation-state." Instead, we ought to think of imperialism, as being determined "by the directionally purposed drive to increase the organic composition of capital at the system-wide level."

But nowhere in the book is there a clear example of imperialist intervention, or a clear sense of what this would entail. According to Arboleda, "the content of these mediations," is not, as dominant accounts would suggest, "the pursuit for 'hegemonic status' within the interstate system," but rather "the production of a technological exoskeleton that extends to multiple resource frontiers – in the form of railways, ports, waterways, power plants, roads, debt instruments, digital platforms, and so forth – in order to support the expanded reproduction of capital on the basis of machinofacturing." In this list of mediated content, how are we expected to distinguish between the roles of private capital, state power, and imperial intervention?

Arboleda is compelling in his dismissal of theories of imperialism rooted in "dual logics" – one territorial and the other capitalist – advanced in different ways by the likes of David Harvey and Giovanni Arrighi. He is right to counter politicist readings of imperialism with a perspective that places "a greater emphasis on economic and systemic determinations," and which "takes seriously the essential unity of global accumulation." The prime mover of imperial relations, on this account, is not a politically autonomous hegemon but "the abstract, directionally purposed forms of social mediation that assert and reassert capital as the alienated subject of modern life," a prime mover to which dominant states are also subject. While states have been and continue to be fundamental to the constitution of global capitalism, they are themselves subordinated to the law of value, which plays out ultimately in and through the world market's unity of production and circulation.

And yet the thrust of Arboleda's alternative theorization of imperialism ultimately falls short of its promise. To begin with, his repeated critique of theories which emphasize the autonomous political compulsions of hegemonic nation-states rather than the global unfolding of the law of value effectively goes to war with straw men, even if it grasps occasionally at something real. Very few serious accounts of imperialism, including most of the highly disparate theoretical traditions he criticizes, actually hold such an exaggerated view of the autonomy of the political. In bending the stick away from this caricatural view of politicism, Arboleda too frequently falls back upon an insufficiently mediated, one-sided, and abstract economism.

Vitiated in his depiction of the unity of the economic and the political are the antagonisms which persist between these elements of the whole as they relate to the problem of imperialism. There is no sense here of new modalities of imperial rivalry and competition, for example. It is easy enough to point out that China is not a “hegemon,” but much more difficult to maintain, as Arboleda does, that it is not seeking to become one in rivalry with the United States. It is true that there is little evidence that China represents now, or will represent in the immediate future, a political-military rival to the United States in Latin America. However, it is unconvincing to deduce from this relatively narrow empirical question that supply chains have somehow replaced military might in the Chinese state’s projection of power beyond its borders, much less its strategy for coming decades. Any cursory glance at the rate of increase of military spending in China in recent decades is confirmation enough of the opposite conclusion. The Pentagon certainly keeps its eyes on these dynamics with more acuity than Arboleda.

For a value-theoretic account of the production of resource frontiers in the context of novel imperial configurations to be plausible, much more fine-grained attentiveness to the mediations between different levels of abstraction is required. Equally, there needs to be a richer engagement with the political and ideological elements of imperialism, not as strawmen “autonomous” factors of analysis, but as contradictory and sometimes antagonistic parts of a unitary economic-political whole. It is insufficient merely to assert that “the essential level (the total surplus value of society) acquires phenomenal reality in sensuous experience via the messy materialities and entanglements of firms and states.”

Whatever the shortcomings of Arboleda’s overarching theoretical intervention on imperialism, his associated critique of the politicist voluntarism of many accounts of the Pink Tide experience in Latin America in recent decades is exactly right. “Most importantly,” he writes, this kind of thinking “leads to the sort of reformist view where it would be considered possible to transform society by the mere conquest of political institutions. The case of the post-neoliberal governments of Latin America’s ‘Pink Tide’ illustrates that claims to ‘national liberation’ are severely limited without a more comprehensive project to supersede the modern forms of labor that act as the foundation of the political apparatus.” The conquest of political institutions by reformist governments in countries as varied as Bolivia, Ecuador, and Venezuela did not prevent them from becoming “even more dependent on primary-commodity exports and more aggressively subsumed in the cyclical compulsions of the world market.”

State Power and Logistics

Arboleda is sometimes pathbreaking in his survey of developments in state power and logistics in the neoliberal era. His most important innovation to well-established Marxist understandings of the neoliberal state, is the specificity of its inflections in Chile, especially in the light of the logistics revolution. Understood as “a revolution in the production and realization of value,” it is bound to have had serious implications for the “reconfiguration of the institutional materiality or form of the state.”

Focusing on the port cities in northern Chile, Arboleda maps the territorial and sociopolitical ramifications of the logistics turn within extractivism. Embedded in this turn are “organizational imperatives toward flow, connectivity, and speed in mining operations [which] has led a modality of logistical urbanization in which the governance of mineral flows assumes increasing salience vis-à-vis the moment of extraction.” The Chilean mining industry has come under tremendous pressure to introduce the latest extractive and logistic technologies; to reduce costs of transportation and accelerate the speed of mineral circulation. This has meant the functional integration of distinct stages of the mining process and their seamless linkages to ports and the wider shipping industry.

While these features of competition in extractive industries have long shaped the relationship between primary-commodity producers and distant manufacturing centres in the history of capitalism, the logistics revolution represents a qualitative deepening and expansion insofar as it has “deliberately and decisively blurred the

boundaries between making and moving – production and distribution." Previously deemed a cost, transportation is transformed into a "privileged site for adding value to commodities," as part of a wider "tendency to accelerate the valorization of capital and to integrate the phases of production conceptually and organizationally under systemic and holistic modes of corporate rationality." The transcontinental networks of trade infrastructure – "railways, highways, automated port infrastructures, and supertankers" – at one and the same time express the intensified "impersonal, directionally purposed compulsions that are immanent to the reproduction of capital as an alienated subject," and depend upon the political mediations of nation-state authority. Arboleda demonstrates how "logistical urbanization" engendered both the scaling-up of internationalized statecraft and a centralization, hardening, and concentration of political authority in what he calls the "late liberal state."

The internationalized and scaled-up modes of statecraft are revealed in Chile's membership in multilateral institutions such as Asia-Pacific Economic Cooperation (APEC) and the Pacific Alliance, where we witness the logic of enhancing logistical connectivity and the speed of production and circulation across extractive supply chains through attempts at labor-regime, policy, and legal-system standardization.

Arboleda demonstrates how a series of institutional redesigns express the priorities of the Chilean state in the area of logistical integration and efficiency. A maximal expression of this trend was the creation in 2010 by the Ministry of Transport and Telecommunications of the Logistical Development Program, "commissioned to lead planning in intermodal transport systems and physical infrastructures of connectivity." But efforts to "modernize" the Chilean port system date back to the late 1990s. In that period, Chile was undergoing a major commercial pivot toward Asia and in an effort to incentivize competitive advances in logistical operations, state managers privatized the bulk of port facilities and encouraged "nationwide movement toward automation, containerization, and standardization of port activity." A decade hence, "port fees had been reduced by 30 percent and investment in port infrastructure and technology had surpassed $341 million," while "transfer speed had increased by 51 percent and port efficiency by 100 percent." The implications for the built infrastructures and ecosystems of Chile's principal mineral-exporting zones were enormous.

Changes to the legal structures of territorial planning transferred significant decision-making powers from municipalities to the national level, such that, for example, "ports in Chile tend to develop independently of the cities in which they are located." Such concentration of authority is tightly connected to the state's concern with containing labor disruption at any stage of its extractive supply chain. The visible priorities of state managers in this regard has had a politicizing effect on superficially economic protest in the port and mining industries.

"Strikes in these industries," Arboleda shows, "have been increasingly taking the form of blockades and technical sabotage, tactics understood to be at once labor insurgency and political protest against the state." In particular, he hones in on the cycle of strikes in 2013 sparked by workers at the ports of Angamos and Mejillone, in Antofagasta. The strikers demanded a half-hour remunerated lunch break and denounced the precarity of working conditions for those employees hired on eight-hour contracts. The match in Antofagasta lit a fire that extended through the majority of ports in the country, with a multifaceted repertoire of revolt, moving through road blockades and barricades, to the cessation of all port operations.

Ferocious state repression in response assumed the form of antiriot vehicles equipped with water and tear-gas cannons, and the intervention of heavily armed police, alongside army and navy officials. Such above-ground displays of state authority on behalf of extractive capital were accompanied by the slower, subterranean burn of constant surveillance and harassment of union militants in the port and mining industries by secret police and domestic intelligence agencies.

In this sense, *Planetary Mine* exposes a deeper, longer-standing, and more structural foundation to the increasingly authoritarian characteristics of liberal rule across much of the globe in the post-2008 crisis period. This more

profound historical and theoretical foundation tends to get lost in the contingent explanations proffered in most of the extant literature on “neoliberal authoritarianism.” Arboleda’s account also provides a counter-balance to the typical treatment of the state in literature on Latin American extractivism, which tends toward liberalism, or anarchistic post-developmentalism, or excessively politicist traditions of Marxism which exaggerate the malleability of the capitalist state.

Modern and Vernacular

Arboleda offers a series of original and penetrating theoretical reflections on revolutionary subjectivity in Chile, and Latin America more widely, given the novel features of the modes of existence of labor running through the economies of extraction. Arboleda sees in the “sociotechnical foundations of large-scale industry” the possible bases for “another mode of universality, one based on concrete specificity rather than on abstraction.” In particular, he eyes contemporary indigenous and peasant struggles around extraction – together with the movements of migrants, debtor groups, and other plebeian elements of the collective laborer – as “already hint[ing] at the possibility of another kind of generalized interdependence between peoples, ecologies, and technologies.”

His conceptualization of such a generalized interdependence breaks simultaneously with teleological and Eurocentric readings of an imagined industrial proletariat as the privileged revolutionary subject, and romantic fetishizations of culturally specific, indigenous, pre-capitalist subjects. The utopian-revolutionary dialectic running through the work of José Carlos Mariátegui – with selective elements from the precapitalist class mobilized together with a forward-looking revolutionary perspective on a post-capitalist future – becomes one animating source of Arboleda’s inquiry into prospective unities of vernacular and modern science in struggle.

“In the case of primary-commodity production,” he writes, “it is the actual encounter between indigenous, campesino, and women’s groups with scientists, artists, and engineers – itself an encounter between vernacular science and modern science – that has triggered the most vibrant, hopeful political forces in contemporary Latin America.” Integral to his framing of this question is the material connection that exists between “the lives of peasants and indigenous communities in geographies of extraction” and “those of workers in the manufacturing, logistics, and service industries.” A key part of Arboleda’s political and theoretical intervention is an attempt to make visible the hidden connections linking together “struggles unfolding throughout the mining supply chain, mostly led by the peasant and indigenous communities whose lives are being radically transformed by debt, proletarianization, urbanization, and technological change.”

In order to do so, he puts the non-linearity of the late-Marx (especially his notes on Maxim Kovalevski and the letter to Vera Zasulich of 1881) into conversation with Frederic Jameson’s notion of a “utopian archipelago,” explorations of the “universal ayllu” in the early writings Álvaro García Linera, Bolívar Echeverría’s “baroque modernity,” and “ch’iximodernity” in the work of Silvia Rivera Cusicanqui. In late-Marx, of interest here is his shift from a “unidirectional” perspective of international revolution unfolding from Europe, toward a genuine interest “in tracing the relations between proletarian struggles in the metropolis and anticolonial movements in the colonies.” In the communal forms of social production that Marx noted in his unpublished explorations of precapitalist societies, he located “some of the embryonic and unrealized forms of the universalized political community of the future.”

They could not on their own form the basis of a future post-capitalist society given their limited technical capacity and isolated existence. However, once sufficiently developed productive forces of society, brought into existence through socialized forms of labor, were established through the uneven development of capitalism globally, it was not necessary or desirable that these communal associations be steam-rolled in the name of progress. Rather, they could, in unity with the harnessing of capacities unleashed by the development of productive forces, lay the basis for a similar kind of utopian-revolutionary dialectic envisioned later by Mariátegui. At one point, Arboleda calls his own

version of this perspective “the theorization and practical construction of a subaltern futurism that is global, pluralistic, and revolutionary.”

The early writing of García Linera is crucial here insofar as it contains one of the preeminent interpretations of the late-Marx, properly translated to the Bolivian and Latin American contexts. Similarly to how Marx conceived the Russian peasant commune, García Linera “considered the Andean indigenous and peasant ayllu (i.e. a form of communal association in the Andean region, especially among the Quechuas and Aymaras) a potential model and starting point for the universalized political community of the future.” For García Linera, Arboleda notes, “an authentic insurgency against the domination of capital is simply unthinkable outside the communal and class struggle to universalize the communal and social rationality that characterizes the ayllu.” As in Mariátegui, this is not a backward-looking pastoral romanticism, but a way of articulating a forward-looking communism correspondent with indigenous liberation in the Andean setting. As in Marx, for the early García Linera, the insularity and technical limitations of the ancient communal form “could be overcome as a result of the sociomaterial powers inadvertently unleashed by the technological basis of social production under capitalism.” Modern capitalist society, in other words, could enable the unintended universalization of the ayllu form.

For Arboleda, Echeverría and Rivera Cusicanqui’s respective understandings of “baroque” and “ch’ixi” modernity, together with the late-Marx, Mariátegui, and the early García Linera, capture in the present Latin American context the ways in which, “local communities’ encounters with technological infrastructures of extraction – from power plants, to surveillance cameras to laptops and smartphones – are laying the foundations for the novel framework of generalized interdependence.” The spreading tentacles of mining and logistical infrastructures across Chilean and other Latin American countryside, “can provide the means by which the commune-form or ayllu becomes capable of tearing open the fetters of its insularity and expanding the framework of its societal relations.”

Arboleda’s passages on the universal and the particular, as well those on the utopian-revolutionary dialectic of the precapitalist past and socialist future, are provocative and occasionally luminous. They bridge nicely to the related issues of the separation of manual and intellectual work, of science from life, and the potentially explosive possibility of an insurgent unity of vernacular and modern science in struggle. If the estrangement between science and life has reached its apogee in the fourth machine age, it is also true that “the foundations of the division between sensuous experience and rational abstraction… are brittle and unstable.” In this context, dissident “intellectual workers have begun to question the nonsense and futility of contemporary science, especially of a model of scientific knowledge that subordinates the totality of their skills, capacities, and potentialities to the immediate needs of profit-making.”

Arboleda tracks instances of “rogue scientists and engineers” – from geologists to geophysicists – turning against large-scale extractive multinationals, and instead toward “providing training and physical equipment for indigenous communities to measure air and water pollution in their territories and thus support their lawsuits and other legal mechanisms with scientifically reliable evidence.” As a consequence of such collaborative and dialogic endeavours, “indigenous peoples have also become proficient in using drones to monitor and expose the destruction of forests, water sources, and ecosystems by oil and mining companies.”

One weakness in the discussion of revolutionary subjectivity is the automaticity with which it is imagined to come about. Almost as in an input-output equation, technological development of extractive infrastructures and transformations in the technical composition of extractive labor seems to translate in Arboleda’s account into synergies of vernacular and modern science in struggle, the terrain of the universal ayllu. The complexities of class formation and of politics are, in the main, evacuated from the scene of investigation, as they were on the question of imperialism. There is little sense of the role of militant organizers or left-wing party activists conducting the painstaking work of grassroots building. Rather, there is, an at times untethered, spontaneism.

Arboleda also maintains too seamless a notion of the transformation between today’s ugly uses of the latest

technologies and tomorrow's emancipatory retooling of their capacities to meet human needs and ecological sustainability. "The monstrous robots of extraction that today gobble the forests, arable lands, rivers, and ocean floors might be dream images of the technological landscapes of tomorrow," Arboleda insists, "where humans and machines are no longer character masks of alien forces but work for the buen vivir of the whole society." While the emancipatory potential of extant technology clearly needs harvesting by any reasonable eco-socialist theory, it is unconvincing – and potential fuel to the fires of techno-fetishistic solutions to ecological crisis – to imagine that all existing destructive machinery might be so easily retrofitted for good.

With the COVID-19 pandemic continuing to wreak a particularly devastating havoc through much of Latin America surely there has never been a better moment for the kind of unity in struggle of vernacular and modern science (on the terrain of health, as in ecology) – united in defence of life against the priorities of capital. Likewise, the viral transmission of COVID-19 along the logistical corridors and supply chains of world trade and the underlying infrastructures of the fourth machine age aptly convey the wisdom of Arboleda's world-scale analysis, and expose the parochialism of methodological nationalism.

A global recession was already in motion prior to the pandemic, but the vagaries of COVID-19 have intensified its depth and scale to an unprecedented degree. As Arboleda's framework of analysis would intuit, the early waves of China's industrial and commercial lockdowns have now ricocheted through the economies of Latin America with devastating effect. The modest gains accrued in the realms of poverty and income inequality reduction over the course of the Pink Tide era were already in stasis or decline since 2013; in 2020 they have suffered remarkable further regression, in step with catastrophic economic contraction.

Arboleda grapples with a prodigious range of theoretical and analytical problems in *Planetary Mine*, and he does so with moments of brilliance. This is a work of dextrous ingenuity, rooted in years of theoretical development and sustained empirical work. Inevitably, given the scope of inquiry, his execution is uneven; but there are few better guides than *Planetary Mine* to the possible economic and technological futures of Latin American likely to emerge in the wake of COVID-19. Arboleda's remarkable first book has few peers in theoretical ambition and range among the Anglophone offerings on extractive capitalism.

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