

Petromodernity, petro-finance and plastic in Karen Tei Yamashita's *Through the Arc of the Rainforest*

Treasa De Loughry*

Department of English, National University of Ireland, Maynooth, Ireland

*Email: treasa.deloughry@gmail.com

This article reads Karen Tei Yamashita's *Through the Arc of the Rainforest* (1990) and its account of the discovery of the Matacão – a mysterious plastic bedrock found in Brazil's Amazon rainforest – as bound to the nation's recent history of neoliberal financialization and petrolic extraction. The Matacão is examined as an allegory for the dispossession of peasant communities by multinational capitalism through its references to historical resource rushes as well as the developmental arcs of discovery, excavation and exhaustion attending commodity booms. The discussion concludes by examining the text's framing of North American influence in Brazil alongside the emergence of extra-human resistance to the commodification of the Amazon. Amanda Boetzkes and Andrew Pendakis have argued that plastic makes “visible a stratigraphy of oil capital”, and likewise, this article connects the local and global production of petro-ecological surpluses, petro-plastic waste and petro-dollar debt as rendered in Yamashita's novel.

Key words: Karen Tei Yamashita; *Through the Arc of the Rainforest*; Brazil; Amazon rainforest; world-ecology; petromodernity; petro-finance; plastic

Leo Baekeland discovered the first synthetic polymer, Bakelite, in 1907. By the end of the 1930s plastic production was rapidly rising, and writers were extolling the emergence of a “fourth” natural kingdom alongside the “Vegetable, Mineral and Animal” worlds (Thomas quoted in Meikle 1995, 114). By then, plastic had replaced natural materials such as rubber, shellac and ivory, and was central to the manufacturing of military technology and cheap commodities. In 1940 *Fortune* magazine published a large colour map of a continent called “Synthetica”, registering plastic's potential as a new scientific frontier and profitable commercial realm. The map depicts a continent with a northerly isthmus, bulging westwards before tapering to a narrow southern half, resembling a Latin America flipped sideways. Nation-states are named after major plastic chemicals (cellulose, petroliia, lignin), their capitals after plastic brands (fibestos, petropol), interiors broken down into specific sub-groups (cellulose acetate butyrate, chloroprene) and regions striated by “Great chemical” waterways (great acetylene river, asphalt lake). Northwards is the realm of “natural resins”,

while just visible on the map's edge, within the realm of natural polymers, stands a "wild area of firs and rubber plantations" ("Synthetica: A New Continent of Plastics", 1940).

The shape of Synthetica speaks to Latin America's ongoing colonization and transformation into a region of export commodities, with its naming scheme powerfully suggesting the historical commodity maps of Latin America that abstract the continent's variegated topography and political terrain into popular export monocrops like coffee, sugar, oil and copper (Beckmann 2013, xii-xiii). Such documents give life to the rapacious colonization, mapping and mining that attends the search for and claiming of raw materials, the most intensive of which currently is the search for new oil reserves. Historian of plastic Jeffrey Meikle (1995) notes that Synthetica included "areas of dark viscous flow [...] evoking images of coal tar, asphalt, petroleum" (66), pointing towards plastic's origin in the modernizing and expanding production of early 20th century petroleum industries, and their need to find a use for hydrocarbon by-products, as well as the future of extractive energy frontiers in Latin America seen in the construction of megadams, production of ethanol crops and hunt for offshore oil and gas.

I start with Synthetica because the search for new energy frontiers has structured the socio-economic and ecological reorganizations of mid- and late 20th century Brazil, and it is to this previous and ongoing history of extraction that Karen Tei Yamashita's (1990) novel *Through the Arc of the Rainforest* speaks. *Through the Arc* imagines the frantic commodity boom occasioned by the discovery of a hard, black, mysterious substance called Matacão in the Amazon rainforest in Brazil. The Matacão is comprised of non-biodegradable plastic waste produced in the global North, which, having been compressed under the earth's mantle, reappears in the most remote "virgin areas of the Earth" (Yamashita 1990, 202) – that is, the Amazon and Brazil's impoverished north east – thus literalizing the "slow violence" (see Nixon 2011) of uneven development by which peripheral zones are exposed to the most

damaging chemical industries as well as their waste products. Yet, in an ironic reversal, the Matacão is not just an impenetrable block of waste: like oil, it has a black “slick shiny surface” (Yamashita 1990, 17) and, once mined, it takes on truly transformative properties. It is infinitely transmutable and can mimic any other material substance, including plants and food, meaning that overnight it becomes a sensational new export commodity.

The miraculous Matacão, and the attendant commodity boom that follows its discovery, leads to the complete excavation of the Amazon by American multinationals, the emergence of a Matacão-based theme park and an upsurge of salvific religious movements. The Matacão’s magical production of wealth is contiguous with what Jennifer Wenzel (2006) describes as the “petro-magic-realism” of Nigerian oil fictions. For Wenzel, these works imagine the transmutation of oil into spectacular life-changing wealth (451) but also the “phantasmagoric ravagements” (458) of socio-ecological relations (see also Barrett and Worden 2014, xxiv-xxv). Wenzel draws her definition of petro-magic-realism from Alejo Carpentier’s ([1949] 1995) “lo real maravilloso” and Fredric Jameson’s (1986) corresponding account of “magic realism” as the depiction of a fantastical reality in which pre-capitalist and colonial modes of production coexist in the present-day. She nevertheless argues for the “decidedly modern” aspect of contemporary global oil extraction which, she suggests, drives recent Nigerian magic-realist petrofiction (Wenzel 2006, 457). Wenzel thus captures the powerful, even unprecedented effects of oil in radically altering built environments, ecologies, social relations, material life and aspirations, all of which register in fiction through (petro-)magical aesthetics that use estrangement and the fantastic to make visible oil’s awful effects.

While *Through the Arc*’s boom-and-bust dynamics could be read as reimagining previous 20th-century patterns of Latin American structural hyperinflation, commodity crises and foreign debt (see Beckman 2013), I examine the Matacão specifically as a critique of the

transformation of the Brazilian Amazon by the nation's military regime in the 1960s and 1970s. This militarized transfiguration was both due to and contingent upon the IMF's Structural Adjustment Programs and cheap petro-dollar loans that led to the neoliberal financialization of the environment across the world-system and its resource peripheries, in particular. Plastic thus operates as a literal and allegorical obstacle to local forms of subsistence in *Through the Arc* precisely because of global oil, petro-finance and petro-plastic waste. Despite the Matacão's apparent propinquity to oil in its nimble transformation into commodities and capital, however, cultural critics tend to argue for the "structural occlusion" (Macdonald 2013, 6) of oil production and related waste due to its geographic and spatial displacement. Such occlusion makes it difficult to uncover the origins of oil-derived materials like plastic, and disrupts our ability to apprehend plastic's signification of both middle-class comfort in systemic cores *and* the toxic material and chemical waste that is displaced on to "underpolluted" peripheral regions. This logic of displacement was made explicit by Larry Summers's infamous World Bank memo on the possibility of dumping waste in "underpolluted" countries – termed "Least Developed Countries" (LDCs) – in order to maintain surplus production and consumption in wealthier (what we might call "core") states (Summers, quoted in Rob Nixon 2011, 1). Further, the complex scales and networks linking oil and financialization make it hard to parse the rush of neoliberal financial activities designed to "asset-strip" labour and nature as engendered by the flood of petro-dollars in the 1970s (Moore 2010a, 231). It is with the above three issues that this article is concerned, offering *Through the Arc* as a case study for the (petro)cultural imaginary of plastic, and demonstrating a critical reading practice that goes beyond the local problems of Brazilian extractivism by binding the national and world-systemic scales of our global oil society.

My account of the networks of oil financing and ecological degradation in *Through the Arc* builds on Ursula Heise's (2004) argument that the text necessitates a reading that

moves beyond Asian-American categories towards analysis of how “reflections on regional identity translate into scenarios of global connectivity and ecological alienation” (127). Yet this article goes still further in arguing that the novel’s syncretic account of residual and emergent colonial and imperial structures and capitalist flows necessitates a world-ecological conceptual practice. Such an approach to reading *Through the Arc*’s production of global networks of fuel and finance marks a point of departure from other critical work on plastic that tends to focus on the banality and danger of plastic pollution. One such work is *Petroleum Manga*, compiled by North American visual artist Marina Zurkow (2014), which includes child-like black-and-white cartoons of plastic objects alongside quixotic meditations by over thirty contributors, who use the toxicity, ubiquity and consumer promise of plastic objects as starting points for imaginative and philosophical investigations into the effects of endocrine disruptions (whereby chemical-transmitting plastics disrupt life on a molecular scale) as well as the structuring of contemporary experiences of consumer desire, convenience and pleasure. Likewise, *Polymers*, a volume by Canadian poet Adam Dickinson (2013), uses an experimental combination of polymeric images and associative phrases to structure his enigmatic poems. For Dickinson (2016), plastic’s detrimental effects on endocrinal systems are a biosemiotic form of writing (17), and an expression of plastic’s agential force, offering an alternate view into the agency of non-human elements and their coproduction of “metabolic poetics” (19), which necessitates a “pataphysics” or linguistic play as a response to “the hyperobject of chemical pollution” (17).

Rather than viewing plastic through Dickinson’s new materialist approach to biosemiotics as a form “of media expressing the biology of petroculture” (2016, 20), or in terms of its registration of visible and invisible pollution (see Davis 2015, 347-358), this article reads *Through the Arc*’s deployment of plastic as a symbol for the text’s world-systemic registration of the uneven effects of petro-plastic pollution and oil financing.

Although the Matacão's mysterious appearance erases its links to heavy industry, to the rigs and pumps of oil production, this is not to say that, like plastic objects in everyday life, it is without historicity or geographic specificity. Rather, the Matacão's appearance in Brazil – a nation whose economy and ecology are defined by successive commodity frontiers – purposefully triangulates its origins in commodity booms through which narratives of scarcity necessitate radical interventions and reorganizations of ecosystems. This article therefore takes up Amanda Boetzkes and Andrew Pendakis's (2013) account of plastic as making “visible a stratigraphy of oil capital” (4), and seeks to elaborate upon their insight by reconnecting oil's production of material goods and ecological surplus with petroleum's infinite mutability *and* the industry's strategic fuelling of foreign debt. The first section examines Brazil's transformation from the 1960s onwards, moving from industrialization towards agri-exports as funded by petro-dollar debt mechanisms. This history is framed by a world-ecological theory linking the local appropriation of resources with the global financialization of nature. The article then offers a close reading of *Through the Arc's* signification of global neoliberal strategies through an analysis of the Matacão as an allegory for the dispossession of peasant communities by multinational capitalism. My reading focalizes the Matacão's uncanny references to historical-economic resource rushes as well as the text's rapid compression, which signals the rapacious developmental arcs of discovery, excavation and exhaustion attending commodity booms. It concludes by examining the text's framing of North American military and cultural influence in Brazil but also the concomitant emergence of extra-human forms of resistance to the commodification of the Amazon, which destroys the socio-ecological basis for capital accumulation.

Brazil's history of neoliberalism

Ever since its colonization in 1500, Brazil's economic history has been structured by extractive policies and commodity manias, including the 17th century sugar rush followed by a late 17th and early 18th century surge in gold mining; the late 19th century rubber boom and subsequent emergence of "Fordlandia" and other industrial rubber plantations in the early 20th century; and the late 19th and 20th century expansion of large-scale coffee plantations propping up Brazil's commodity export economy to this day. It was the period after the military coup of 1964, though, that saw the transformation of the Amazon rainforest into yet another new commodity – and, indeed, waste (see Moore 2014, 38) – frontier. In the 1960s and 1970s the Brazilian military government actively sought out cheap international debt from the World Bank to initiate infrastructural and agribusiness projects in the underdeveloped north. Rolled out under the banner of "Operation Amazonia", these projects included the development of new dams, cattle ranches, industries and mines – all of which exacerbated land clearing and created violent turf wars between indigenous settlers and predatory land speculators. The World Bank's cheap loans were funded by petro-dollars: with the rising price of oil, OPEC's producing nations deposited dollar surpluses into Wall Street banks that developed a series of financial mechanisms, such as Structural Adjustment Programs, to recycle the money as debt. This, in turn, financed infrastructure projects throughout developing nations, and led to a boom in short-term but lucrative agricultural projects and export crops (see Niblett 2012, 26; Ortiz 2016, 611). With agro-industrialization dominated by the imperatives of "finance capital and its valuation of labor and nature in terms of short-term profitability" (Ortiz 2016, 617), Brazil was encouraged to transition from an industrialized economy towards one based on high-profit agro-exports in order to service its debt repayments.

Petromodern production, consumption and debt-financing are central to the advent of neoliberalism in the 1970s, and what environmental historian Jason W. Moore (2010a) calls the frontier-led appropriations of cheap nature and unpaid work necessary for the rapid expansion of capitalist accumulation (233). For Moore, the neoliberal period “represents a new era of nature-society relations in capitalism” (2011, 44), with the reproduction of social and ecological life requiring a “circuit” of credit capitalism, rather than accumulation based on industry or agriculture. The goal is to secure the “cheap” (Moore 2010b, 392) inputs of energy, raw materials, food and labour to drive down production costs (see also Niblett 2012, 18), creating the conditions for future rounds of accumulation through financial mechanisms but without a concurrent “agricultural revolution” (Moore 2010a, 231).

Exemplifying neoliberalism’s financialization of socio-ecological relations, the Brazilian Amazon became the site for intense extractive techniques and agrochemical fixes via the Green Revolution, as well as the intensified mechanization of agriculture, yielding new export monocrops (Ortiz 2016, 611). This was enabled through narratives of national modernization that were both coextensive with and consolidated by speculative financial mechanisms, including cheap subsidized credit, hyperinflation, “tax holidays, fiscal incentives” and access to “sub-surface royalties” through complex land ownership and forest clearance laws (Hecht 1989, 40-41). Jurisprudence, financialization and narratives of Manifest Destiny were likewise co-produced through and with a bundle of socio-ecological relations, just as local cultures and affects unevenly combined with global restructuring and the extraction of cheap natures. After the oil shocks of 1973 and 1979, however, floating foreign loans increased massively due to the high cost of oil import bills and the increase in global interest rates. Consequently, by the time of Mexico’s loan default in 1982, Brazil was, as Todd Edwards (2008) explains, the most indebted country in the developing world before defaulting on its loans (115). Unusually, Brazil was able to avoid IMF loan schemes due to its

strong agricultural production, extraction of raw materials and national government bonds, but the 1980s proved to be a “lost decade” (Edwards 2008, 115) of poverty, hunger and disease for most Latin American nations.

Taking into account the history of neoliberalism’s financialization of the environment, the fuelling of debt markets by petro-dollars and the transition towards cash-rich infrastructural programs and crops, this article reads Yamashita’s *Through the Arc* for its world-ecological indictment of extractive booms, petro-speculation and local dispossession. The first section examines the text’s critique of the developmental waves of commodity booms and busts by reading the novel’s structural arc, its narrative account of dispossessed peasants and the Matacão’s allegorical significance as a block to local subsistence through its references to recent Structural Adjustment Programs, including the construction of failed nuclear power plants, dams and the devastation caused by the zoning and extraction of Brazil’s northeastern provinces. The second half of the article foregrounds plastic’s links to American hegemony, and concludes by reading the appearance of a plastic-eating bacteria and typhus epidemic in Yamashita’s novel through Moore’s theory of declining food yields and super-viruses, arguing that the text’s imagined bacterial epidemic registers the latent emergence of these forms of extra-human resistance in the face of neoliberalism’s socio-ecological exhaustion.

Part I: Development

Through the Arc is narrated by a golf ball-sized sphere of Matacão that floats in front of the main character, a retired Japanese rail inspector named Kazumasa Ishimaru. The ball is attracted to the Matacão bedrock beneath the Amazon, and Kazumasa is soon pressed by an American multinational called GGG to discover further plastic deposits. Aside from prospectors, the Matacão plain attracts other parties interested in its magnetic qualities and

seemingly miraculous effects, including religious devotees and zealots of the new healing trend in “featherology” (Yamashita 1990, 150). The origins of this peculiar substance are initially unknown. Indeed, it is described as either an “alien” substance or a CIA hoax (95) until a computer reveals that the material is made from polymer chains, or a “polyurethane family commonly known as plastic” (97). With this discovery, it becomes clear that decades of plastic waste have compressed under the earth’s surface, only to reappear in the Amazon basin.

The Matacão operates not merely as a symbol for the unequal displacement of plastic pollution to peripheral regions, but as an allegory for the dispossession of peasants from their lands through petro-dollar financed infrastructural projects, government developmental plans and environmental destruction. Peasant Mané Pena, who first notices the Matacão after disastrous government forest clearances, acts as a bellwether for the deleterious effects of recent Amazonian modernization programs. Originally, he wanders the forest “fishing, tapping rubber and collecting Brazil nuts” (Yamashita 1990, 16), until government officials clear the land of rubber trees and repurpose the area for development, inadvertently exposing the plastic deposits in the process. But prior to the exposure of the Matacão by deforestation, drought and floods, Mané had known that the “primeval forest was not primeval” (16) and that the soil’s “tubes had been tied long ago” (17) because he could not penetrate the plastic to access the water beneath. Mané’s inability to pierce the Matacão – and the land’s lack of fertility after the clearances – underscores the significance of the mined polymer as an allegory for the dispossession of peasants by government developmental programs funded by the World Bank. Not only is the region described as “poor” (16) and “eroding” (17), producing only a “paltry stubble of manioc” (16), but local communities are both literally and figuratively blocked from accessing any residual agricultural potential by the forcible curtailment of small-scale rubber tapping in favour of ruinous ranches and huge landholdings.

Further critiquing Brazil's recent history of rapid development and extractivism, *Through the Arc*'s naming structure is based on the arcs of speculative commodity frontiers: from "Part I: The Beginning", to "Part II: The Developing World", "Part III: More Development", "Part IV: Loss of Innocence", "Part V: More Loss" and "Part VI: Return". By using developmental arcs as its compositional structure, with six interrelated stories emerging across six distinct sections, the novel marries its formal compression with a thematic critique of short-term overheated neoliberal resource manias catalysed by injections of capital and labour. The description of Mané's life takes on a similarly rapid trajectory from the "innocence" of pre-economic modernization, to the experience and "terrible ruthlessness" (vii) of economic expansion throughout the Amazon and, indeed, the accelerated loss of his rubber trees. Within several years, he and his family are forced to move to "low-cost, riverside condominiums built on the edges of the Matacão", but soon thereafter the buildings are "condemned" and replaced with luxurious developments and US fast-food chains to cater to the growing tourist trade (Yamashita 1990, 17). As Mané notes, the arid landscape cannot sustain local people, but through the machinations of speculative investment it is a fertile place for growing "buildings!" (77).

The Matacão plain, like the world's vast oil fields, is inaccessible to those without access to vast research funds and sophisticated technologies. As hard as diamonds, the Matacão can only be cut by an American corporation called GGG who discover that a "laser [...] with amino acids and other chemical compounds" (Yamashita 1990, 97) can slice through the rock. J.B. Tweep, the CEO of GGG, initially moves to the Matacão to capitalize on Mané's account of the healing properties of feathers, or "featherology" (150), but having discovered the miraculous quality of the Matacão to mimic any natural substance, GGG intensifies their monopoly of the plain's resources. Just like the costly importation and construction of the opera house in Manaus during the height of Brazil's rubber boom, Tweep

imports a replica of GGG's New York headquarters to the Amazon, complete with cloned clerks (76). Although the reference to Manaus purposefully triangulates the novel's account of plastic and feather commodity booms with the manic wealth and ambition of the 19th century rubber trade, GGG's investment in its Matacão operation is described as the largest inward investment since the nation's "IMF agreements", and "likened to amounts loaned Brazil for Itaipú, the largest dam in the world, or Angra dos Reis, a nuclear-powered reactor that never worked" (76). The text's references to Itaipú and Angra dos Reis are significant because they were both conceived and developed during the height of the military government's modernization of Brazil's infrastructure through public investment projects funded by the World Bank. Many of the nation's dams were built without consultation with local inhabitants or adequate compensation for displacement and resettlement, and thus acted as foils for the oppression and censorship of anti-government protestors (Khagram 2004, 146). Meanwhile, the Angra dos Reis nuclear power plant, completed in 1982, became a symbol of the nation's potential military prowess and desire to enrich weapons grade uranium (de Castro et al. 1989, 22-25), though it was poorly built and never achieved full capacity.

Continuing its use of previous commodity booms to critique contemporary developmental processes, *Through the Arc* repeatedly references a disastrous series of post-1960s infrastructure programs and associated resource rushes. Lourdes, Kazumasa's love interest, describes how her husband left to work in the Serra Pelada gold mine, which was infamous in the early 1980s for its apocalyptic scenes of environmental degradation, lawlessness and overcrowding (Hecht 1989, 36-37), and was never seen again. Elsewhere, the novel critiques the rapacious rezoning and extraction of minerals, lumber and commodities from Brazil's north east. Indeed, Kazumasa discovers the bulk of his Matacão deposits in the north eastern regions of "Pará, Amazonas, Maranhão, Ceará and Rondônia", and proclaims that "the north of Brazil was a gold mine in plastic" (Yamashita 1990, 144). Significantly, the

Brazilian military government's technocratic, neoliberal extractive model was initially tested in the north east's Amazonian borderlands. Ostensibly moved by the poverty of the region, 1960s post-coup generals zoned the region for development, including Amazonas, Pará, Rondônia and Acre (Velho 1979, 30), through "Operation Amazonia" (Walker et al. 2011, 576). Unsurprisingly, this operation involved significant rainforest clearances, precipitated by the construction of the TransAmazonia highway.

The text's emphasis on the devastation caused by "Operation Amazonia" is revealed in a lengthy and vividly imagined scene following the collapse of the Matacão by a terrible typhus epidemic and plastic-eating bacterium. Leaving the Matacão plain, the survivors pass every devastating neo-colonial ecological activity imaginable. Along a "raw" unpaved road, a "festering gash of a highway", most likely the TransAmazonia express, they observe "hydro-electric plants", "mining projects tirelessly exhausting the treasures of iron, manganese and bauxite" and a "gold rush" akin to that of Serra Pelada, which proves too tempting for a third of a procession who join the "greedy furor". They also pass "fishing fleets", trucks loaded with lumber, rubber and Brazil nuts, charred land cleared for "frantic zebu cattle" and "black-pepper-tree plantations" staffed by migrant Japanese labour (Yamashita 1990, 209). The scene concisely imagines the frantic zoning, surveying and mapping of the land through five- and ten-year government plans, in a language modelled on those of the post-1960s autocratic Brazilian government, which sought to "develop", control and oppress the region's ecology and inhabitants while causing untold ecological ruin:

They passed through the old territorial hideouts of rural guerrillas, trampling over unmarked graves and forgotten sites of strife and massacre. And when the rains stopped, they knew they had passed into northeast Brazil's drought-ridden terrain, the

sun-baked earth spreading out from smoldering asphalt, weaving erosion through the landscape. (210)

Yamashita's descriptive critique of Brazil's modernization pinpoints the extractive nature of "asset-stripping" governmental plans, which depend upon ruinous short-term strategies by mining the remaining frontiers of ancient rainforests, not only hastening the erosion and decline of the region's biome, but also furthering its historical amnesia by erasing the history of radical political groups. Indeed, an ancillary goal of "Operation Amazonia" was to suppress social unrest in the north east by peasant leagues, student protestors, union leaders and communists through arrest, torture, disappearance and assassination (Skidmore 1988, 16-17; Walker et al. 2011, 576). The end result is the exhausted "drought-ridden terrain" of Brazil's north east (Yamashita 1990, 210), transformed into a blistering expanse of sterile bitumen – or semi-solid petroleum. Like the map of "Synthetica", *Through the Arc* imagines Brazil paved over and shot through by the imperatives of petro-modernity: of asphalt roads and plastic mines, both made from oil and requiring oil-based transportation industries for the extraction of iron, timber, hydro-electric energy and cash-crops whose export serves only to repay the neoliberal state's petro-dollar loans.

Part II: Resistance

The intensive ecological ruin and reorganization caused by both the Matacão boom and the feather rush has unintended consequences. Although Yamashita does not theorize her representation of Brazil's ecology, her account of the emergence of a fatal typhus epidemic and plastic-eating bacterium anticipates latent patterns voiced by Moore (2010a) of the declining food yields, superweeds and antibiotic-resistant bacteria that have emerged in the past 15 years as an "extra-human" response to short-term asset-stripping and speculative

financial activities: a response which, for Moore, signals a wider rupture in the conditions for capital accumulation on a world-systemic scale (226). Where capitalism has historically relied on the emergence of new forms of knowledge (including mapping, surveying, temporality and aesthetics [Moore 2014, 305]) in order to abstract, quantify and (de)value nature as both “free” resource and future commodity, neoliberal capitalism’s distinct qualities lie in its alliance with the coercive geopolitical praxis of US hegemony as well as the deepening of accumulation through intensified financialization and what Moore refers to as socio-ecological “asset-stripping”, rather than revolutionizing agriculture (2010a, 231). The combined effect of these practices is to exhaust socio-ecological webs by mining both micro (genetic) and macro (atmospheric) realms of life, and through the strategic displacement of costly toxic chemicals from cores to peripheries (see Moore and Keefer 2011). Nevertheless, beset by the intensive extraction of resources, extra-human natures in turn take on additional agential potential by mutating unpredictably, and exponentially, thereby disrupting capitalism’s rationalized ecological regimes of “cheap” resource extraction (see Moore 2015).

Through the Arc of the Rainforest thus registers, not only the waxing and waning developmental arcs of historical commodity booms, but also the contemporary crisis of neoliberal capital in which new frontiers are created through speculative financial mechanisms and technologies, only to be disrupted by the evolution of extra-human natures. The Matacão plain is structured by two commodity booms that lead to the plain’s ruin: one in feathers and their healing powers, as discovered by Mané Pena, and the other in Matacão plastic. Both are funded by the activities of GGG, aptly named after co-founders George and Georgina Gamble, whose surname suggests GGG’s casino-capitalist speculative approach. J.B. Tweep discovers the feather in an online video of Mané, and realizes that it is the “missing product” (Yamashita 1990, 21) at the heart of GGG’s enterprises. It is invaluable in

meeting the company's short- and long-term investment plans, particularly the \$9.99 requirement, a three-part figure divisible by three, that ironically echoes the three arms of executive J.B. Tweep. A precocious executive, J.B.'s three arms symbolize the adaptive, octopoid expanse of US multinational corporations in Latin America and their perpetual, tentacular search for new and evermore resources, labour and energy frontiers throughout the continent. Aimee Bahng (2008) argues that J.B.'s extra appendage is a "reversal of often racialized tropes of aliens in science fiction" instead taking "the shape of mutant agents of empire" (125). Moreover, J.B.'s plans, like those of the most ambitious oil corporations, extend globally and into the earth's most remote regions, taking in "Greenland, central Australia and Antarctica, not to mention every pocket of virgin tropical forest within 20 degrees latitude of the equator" (Yamashita 1990, 149).

Upon moving to Brazil, Tweep attempts to make "five-year deals" (Yamashita 1990, 78) on brightly coloured parrot feathers that fit his specification of easy availability and luxurious appeal. However, seasoned "feather distributors", having witnessed repeated commodity bubbles, refuse to commit feathers beyond a few months as they speculate that the feather boom could lead to an even bigger resource rush than that seen with the gold mines of "Serra Pelada back in the eighties" (78). Making a humorous comment on resource bubbles, the branding and commodification of feathers takes on absurd proportions, with newspapers and celebrities extolling its restorative qualities. Mané Pena is persuaded to give lectures at the local college, completing the commodification of the feather by appealing to the cultural legitimacy of folkloric medicine, and inadvertently giving rise to a cult of feather worshippers (155). Soon, however, the market is awash with counterfeit and illegal feathers as parrot stocks decrease. Facing a shortage, GGG's research team invest in cheap Matacão replacements, indistinguishable from (and thus, in market terms, equivalent to) the natural substances.

In an ironic play on plastic's origins in dead organic matter, the Matacão is discovered to have a curious capacity to mimic any material or form by conveying the very "glow, moisture, freshness – the very sensation of life" (Yamashita 1990, 142). Reconstituted Matacão thus takes on the nimble qualities of oil's transformation of socio-ecological life and corresponding production of sudden wealth (seemingly) without labour. Soon, it invades the economic, ecological and aesthetic realms of material life by producing a 2.0 "Plastics Age" (143) of endless novelties. Indestructible and magnetic, the Matacão is used in GGG's new "personalized credit cards" (141); for large-scale infrastructural projects, ambitious skyscrapers and "domes" (143); in plastic surgery, ephemeral silky materials and imitation furs; in cars, "teak" Danish furniture, lush plants and even ever-lasting artificial food (142-143), ingested without any apparent harm to the eater. The greatest example of the Matacão's spectacular potential is the theme park Chicolândia, named after radio evangelist Chico Paco, and built entirely out of Matacão plastic. As Bahng notes, Chicolândia's hubristic corporate investment and speculative frenzy is akin to Henry Ford's ill-conceived "Fordlândia" rubber plantation in the Amazon basin from 1928 to 1945 (2008, 131). The famously life-like Matacão creates a "bizarre ecology" of stationary animals exuding a "gassy vinyl scent", amidst roller coasters and eclectic scenes of transhistorical borrowing: "Babylonian towers [...], the Taj Mahal, the docks of Amsterdam, Times Square in New York City, [...] Patagonia, the California gold rush" (Yamashita 1990, 168). Significantly, plastic, a substance associated with artifice and the brashness of American popular culture, is the material used to create a crowded pastiche and simulacra of global history by drawing on an important US cultural reference point, the theme park, in a spectacular display of wealth and hubris.

That plastic emerges from the complex co-production of US postwar cultural, economic and military hegemony is emphasized in an earlier scene in which prospectors

discover a mysterious junkyard of cars and aircrafts buried beneath the rainforest near the Matacão. Lost for decades, the machines date from the 1950s and 1960s – a post-World War II time of US imperialism and rapid hegemonic expansion – and include examples of America’s golden automobile age. Explorers encounter everything from Cadillacs and Dodges to military jeeps and Red Cross ambulances, as well as aircrafts such as “F-86 Sabres, F-4 Phantoms, Huey Cobras, Lear Jets and Piper Cubs” (99), nestled amidst a toxic sludge of napalm, rust and lead. This combination of automobiles, airplanes and chemicals forcefully links Brazil’s geopolitical and ecological transformation with the braggadocio of the US’s 1945 to 1967 period of integrated political, military, economic and cultural empire-building (Wallerstein 1976, 461). Moreover, the junkyard’s armaments signal the covert military backing given by the US in support of the 1964 Brazilian coup against the socialist government of then president João Goulart, which led to twenty years of military dictatorship (see Kornbluh 2004). The combination of napalm, post-war armaments and plastic waste are thus evidence of the ramifications of the US’s post-World War II imperial integration, intensive resource grabbing and ecological degradation. Rather than speaking directly to previous imperial histories of rubber extraction or Portuguese colonization, *Through the Arc* thus literalizes the global, complex and often imperceptible toxic flows, ebbs and rivulets through which US imperial power is felt in peripheral regions as petro-dollar debt, asphalt landscapes, agro-exports and toxic plastic detritus.

However, alongside the text’s powerful account of oxidizing vehicles and aircrafts as a metaphor for America’s global reach and hegemonic decline, the junkyard boasts a number of niche animals who resist the degradation of the environment through extreme adaptations and mutations. A new variety of butterfly only nests in the plastic “vinyl seats of Fords and Chevrolets” (Yamashita 1990, 100), deriving its red colouring from the car’s seeping rust; a mouse evolves that can burrow in exhaust pipes, with specially adapted “suction cups” on its

feet, an immunity to toxic chemicals and “taxi yellow” camouflage (100); a carnivorous “air plant” feeds on insects attracted to rust; monkeys evolve new predacious behaviours by using rusted machine guns against rival primates. Meanwhile local Indian tribes strip the cars of reflective materials for ornate necklaces and headpieces. The junkyard is thus an unintentional and “unparalleled” “ecological experiment” (101) that facilitates the evolution of mutated wildlife, behaviours and artwork amidst a highly poisonous chemical environment. Elsewhere, the run-off from Matacão mining produces “grotesque” mutations in rats of additional limbs, “fangs and tiny horns and an eager appetite for blood” (160), as the violence of ecological ruin begets evolutionary mutations, behaviours and adaptations suited to the vampirish predacity and brutality of neoliberal socio-ecological relations.

Although petro-modernity and imperialism are here marked by environmental devastation, extra-human natures emerge in the Matacão that more properly resist and challenge capitalist extractivism. The relentless commodification of the Amazon produces a bacterium that eats the Matacão plain, destroying Kazumasa’s ball, the theme park Chicolândia, entire buildings, roads, credit cards and, more gruesomely, people with “facial rebuilds” (Yamashita 1990, 207), “additional breasts” and those who ate plastic hamburgers and French fries. It is not merely that the Matacão collapses, but that neoliberal capitalism as a global petro-ecological regime – an entire financial and socio-cultural world dependent upon the production of wealth, spectacle, subjectivity and desire through abundant access to oil and oil-derivatives – fails. Compounding the devastation of the Matacão, the feather boom also facilitates a fatal typhus epidemic. In an attempt to halt the epidemiological wave, a powerful insecticide is sprayed that only serves to kill all the Amazon’s birds, in a scene redolent of Rachel Carson’s 1962 account of the effect of DDT on birds in *Silent Spring* (Heise 2008, 103). Compound ecological crises thus appear at a moment of peak financial overheating and ecological extraction as nature bites back in waves of epidemics that not only

invade the sterile Matacão theme park, but ruin the socio-ecological bases upon which the novel's export capital is premised. As Moore notes, although capitalism "drew wealth from Nature", eventually "Nature will exact its revenge" (2015, 5), through the imminent collapse of the earth's ecology. *Through the Arc* concludes by imagining the exhaustion of the text's magical account of commodity booms due to ecological violence and the corresponding collapse of capital accumulation. This formal and material collapse is simultaneously imagined in the novel's final scene of "pastoral cliché" (Heise 2004, 138): the main narrator, Kazumasa, finds happiness in a nuclear family unit, joining his partner Lourdes and her children on a fecund, Arcadian farm, overflowing with tropical fruit, sugar, coffee and corn. In a novel that so incisively maps and historicizes the movements of global plastic and finance capital, happiness like Kazumasa's seems almost absurd at the text's close, particularly against the backdrop of ecological collapse and compound catastrophe brought about by speculative investment. This insistence on a brief image of nuclear family bliss strikes an inauthentic note of clichéd individualized happiness, a peculiarly regressive mode of sociality and bundle of relations that are set against the collective reimagining required to resist neoliberal development. Despite this last scene, though, plastic emerges as an important symbol throughout Yamashita's novel, registering the utopian qualities of financial petro-modernity, the uneven displacement of toxic waste to peripheries and the world-systemic petro-links that fuel Brazil's recent history of financialization and extraction.

Notes on Contributor

Treasa De Loughry is an assistant lecturer in the Department of English, National University of Ireland Maynooth, a Research Associate at UCD's Humanities Institute, and a Fulbright-National University of Ireland Student scholar. She obtained her doctorate in 2016 from University College Dublin with a thesis titled "The Global Novel and Capitalism-in-Crisis", concerned with representational and disciplinary crises in emergent world-literary theories and contemporary novels. Her research interests include comparative literary studies, the Green Revolution and petrocultures.

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