

Rachel
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Center

Perspectives

New Environmental Histories of Latin America and the Caribbean

Edited by

CLAUDIA LEAL

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RCC Perspectives

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2013 / 7

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What's New?

The genesis of the essays that comprise this volume of *Perspectives* took place a long way from the Rachel Carson Center's home in Munich: energized by the Sixth Symposium of the Society for Latin American and Caribbean Environmental History (SOLCHA) in Villa de Leyva, Colombia, Christof Mauch and Claudia Leal hatched the idea of assembling a group of authors to write a panoramic environmental history of the region. One year later, more than a dozen scholars returned to Colombia to swap sources, debate ideas, and share some "traditional" beverages from the hills of Kentucky and the savannas of Cuba. The results of this intense three-day retreat are represented in the essays presented here, works in progress that intend not only to synthesize existing scholarship, but also to provide new ways of thinking about the geo-historical entities that are "Latin America and the Caribbean." So, what's new?

Written by scholars based in Argentina, Brazil, Colombia, Cuba, Ecuador, and Mexico, in addition to Canada and the United States, the essays in this volume reflect an expanding network of people and institutions studying the environmental histories of Latin America and the Caribbean. The project intends to offer a new synthesis of the field informed by scholarship published in multiple languages and a range of scholarly disciplines including anthropology, ecology, geography, history, and political science.

The essays are also new in the sense that they focus on the nineteenth, twentieth, and early twenty-first centuries. In so doing, we call attention to the early emergence of nation-states as significant variables in shaping histories of claiming, using, and conserving resources. Precisely when some European powers were extending and deepening their empires in Africa and Asia, most of Latin America (less so the Caribbean) was in the early stages of building nation-states based on principles of territorial sovereignty. The nineteenth century also marked the rediscovery of an abundant and diverse Nature. The abundance was partly a legacy of the Columbian Exchange: introduced diseases led to the collapse of Amerindian populations during the sixteenth century, enabling forests and other ecosystems to expand in many parts of Latin America. Perceptions of a vast and fecund (but also dangerously "untamed") nature drove states to promote settlement and economic expansion via logging, mining, and agropastoral systems that often relied on introduced species of plants and animals.

Scholars of Latin America and the Caribbean have long called attention to the importance of the late-nineteenth and early twentieth-century “age of exports,” but the essays gathered here point to the *second* half of the twentieth century as a period of rapid, extensive environmental change driven by rising rates of population growth, state-led economic expansion in both agricultural and industrial sectors, urbanization, and the rise of expert-led, techno-scientific institutions. Paradoxically, various kinds of environmental movements surfaced during this time period that helped to change perceptions of Nature from a source of unlimited abundance to a splendid, yet fragile diversity that continues to motivate the conservation of ecosystems and their non-human inhabitants.

We hope that these articles and the accompanying short bibliography both inform and spark debates. Space limitations, along with other circumstances, have forced us to make some difficult decisions about what to include. Some environments (e.g. urban) do not get the space that they merit; others (oceans and littoral zones) are almost entirely excluded. Some countries and macro-regions are discussed much more than others. However, our goal is not to write an encyclopedia but rather lively, accessible histories that present a range of approaches to environmental history, including regional and thematic, without claiming to be comprehensive.

Thanks in large part to the generosity and cosmopolitan vision of the Rachel Carson Center, this volume is appearing in English, Spanish, and Portuguese to ensure a wide distribution amongst scholars both within and beyond Latin America and the Caribbean, an engaged readership that will hopefully inform the resulting book. We invite readers to provide feedback that will help strengthen this work in progress.

Finally, we extend our heartfelt gratitude to the authors, translators, and especially Christof Mauch and Katie Ritson for their support for this ambitious project.

Histories of Countries and Regions

Chris Boyer and Micheline Cariño

Mexico's Environmental Revolutions¹

Mexico's social revolution of 1910 had far-reaching consequences for the nation's natural environment. Among the most important was its creation of a major agrarian reform that delivered nearly half of all agricultural land—and 60% of forestlands—to rural communities whose residents used the landscape in a very different way from the large estates (*haciendas*) that preceded them. Yet the revolution of 1910 was not the only one to transform the environment between 1850 and the present day: in addition, we must consider the liberal political revolution that erupted in 1854 and the Green Revolution that began in 1943. Each of these revolutions left ecological and political footprints that influenced the subsequent one. Nineteenth-century liberalism cemented the hegemony of private property, opened new investment opportunities, and in the long run promoted the commodification of natural resources. It culminated with the 1876–1911 administration of Porfirio Díaz, which promoted a regime of neo-colonial extractivism characterized by making minerals, water resources, forests, and petroleum available for the virtually unbridled use of foreign investors and corporations. The social revolution of 1910 was, in part, a reaction to this situation. It reorganized land tenure and created the possibility for new social uses of the nation's territory, although revolutionaries never contemplated the elimination of private property or an alternative to the intensive use of natural resources. The Green Revolution ushered in a new phase of intensive use of natural resources, yet it never lived up to the goal of enhancing the productivity of peasant agriculture. In the end, it favored commercial production and the unsustainable use of natural resources.

Mexico's vast expanse of ocean and great geographic diversity contribute to making it one of only 17 countries worldwide classified as ecologically "megadiverse." Its biocultural mosaic is made all the more complex by two parallel mountain ranges that extend from the arid north to the humid south: the Sierra Madre Oriental and Occidental are home to nearly seven million indigenous people, many of whom retain their ancestral language, dress, worldview, and attitudes toward nature. Most of the nation's population resides in the central region, and particularly in the transverse volcanic mountain chain that courses from Veracruz in the east to Colima to the west, passing through Mexico City (the nation's capital since colonial times). Two large peninsulas extend from each end of the country: the Yucatan to the southeast and Baja California in the northwest, as shown on the map.

1 English translation by Shawn Van Ausdal.

Figure 1: Major Biomes of Mexico. Source: Simplified map based on Anthony Challenger, *Utilización y conservación de los ecosistemas terrestres de México. Pasado, presente y futuro.* México: UNAM/CNCUB, 1998. Figure 6.2 (p. 278) and 63. (p. 280). Cartography by Paola Luna.



The liberal revolution that Benito Juárez and Ignacio Comonfort, among others, unleashed in 1854 culminated with the so-called “Reform” of 1855 to 1857. The liberals intended to put an end to forty years of political instability, military misadventures, economic decline, and social unrest that had undermined the nation’s economy. Yet post-independence turmoil also created a respite from the intensive use of natural resources that characterized the final decades of the colonial era, particularly in the mining sector. The liberal political revolution of the 1850s was consolidated with the Diaz administration of 1876–1910, a period known as the *Porfiriato*. This prolonged period of authoritarian stability set the stage for rapid economic development based on foreign investment (especially American) in mining, manufacturing, agriculture, railways, and other infrastructure, as well as finance. Thousands of rural communities lost their land to haciendas and other private property owners as a result of laws that ordered the privatization of communal property. Commercial agriculture expanded dramatically, as did forestry, mining, and petroleum. In sum, Porfirian liberalism set the stage for the exploitation of nature on an unprecedented scale, and was very much at odds with the peasant production practices that struggled to survive in the new, unfavorable context (see Figure 2).

Railways constituted the backbone of Porfirian development. They expanded at an impressive rate between 1875, when the nation had 650 kilometers of track, and 1910, when they had extended to 25,000 kilometers. Half of these rail lines belonged to American companies, and fully 80 percent of all investment in Mexican railways were derived from US stockholders. The railroads were primarily built to transport minerals to North American industries. The pace of railroad construction threatened indigenous lands, as speculators snapped up property wherever they thought the lines might travel. Immense quantities of wood were needed for railroad ties, fuel for steam engines, and for construction. Commercial logging on this scale commodified the forests throughout the country, particularly in the north. Mining in northern Mexico boomed thanks to this transportation revolution. Dozens of mines were established in the copper borderlands. New settlements appeared in the sparsely populated north, along with a growing demand for electricity in the cities and mines.



Figure 2: Sumner W. Matteson, "Corn Patches Fringed with Maquay [sic]," Toluca, 1907. Note the use of maguey plants to mark the boundaries of peasant cornfields (milpas) and to minimize the potential for erosion. The city of Toluca can be seen in the background. Courtesy of Milwaukee Public Museum, Sumner W. Matteson Collection, Catalog No. SWM1-D179.

Commercial agriculture likewise expanded during the Porfiriato, bringing with it an increased demand for water. In the state of Morelos, for example, sugar plantations received water concessions to the Higuera River that, if exercised, would have accounted for over 100 percent of its flow! Some haciendas in central Mexico became proto-agribusinesses that invested in pumps and irrigation works that in some instances drained marshes upon which indigenous people depended for their livelihoods. Almost everywhere, age-old arrangements about the division of water between haciendas and villages broke down, accentuating the social tensions that exploded during the revolution of 1910. The compulsion to control water was even felt in Mexico City, where

a decade-long project to build an elaborate drainage canal to the Valley of Mezquital eventually succeeded in draining Lake Texcoco. This triumph of nineteenth-century engineering nevertheless failed in its primary goal of putting an end to seasonal flooding in the nation's capital; instead, it aggravated water shortages and encouraged so much pumping from the aquifer that some of the city's most iconic structures began to subside in the twentieth century (Vitz 2012).

Mexican intellectuals recognized the threats posed by the dispossession and privatization of natural resources. Biologists, engineers, and agronomists formed scientific societies to discuss their ecological effects. Perhaps the most distinguished was Miguel Ángel de Quevedo, a hydraulic engineer known as the "Apostle of the Tree" for his opposition to deforestation and its impact on urban public health. The alarm sounded by these scientific communities led to the creation of a national forest service, a forestry school, and conservationist legislation that prefigured the rise of twentieth-century ecological thought. The over-intensive use of resources also worried some entrepreneurs who recognized that their own livelihoods would suffer from environmental degradation. In the Gulf of California, for example, one far-sighted businessman invented a technique to artificially culture pearls and pearl nacre; it became the world's first experiment in sustainable pearl aquaculture (Cariño y Monteforte 1999).

The effects of the liberal revolution, particularly the commodification of nature and privatization of indigenous commons, had severe social consequences that contributed to the outbreak of the 1910 revolution. A decade of warfare and displacement reduced the population by 6.6 percent, or one million people. Post-revolutionary regimes strove to fulfill the "revolutionary promises" embodied in the 1917 constitution, including land reform, the management of natural resources by experts, and the nationalization of sub-soil reserves of oil and minerals. The redistribution of land began as early as 1915, but it rapidly expanded during the presidency of Lázaro Cárdenas (1934–40), whose administration granted 18 million hectares to rural communities. Cárdenas pushed through conservationist legislation and established institutions dedicated to resource management. He nationalized strategic industries such as petroleum extraction, which had been controlled by North American and British corporations since the first decades of the twentieth century. The industry at that point was centered in the Huasteca region of Veracruz, where foreign corporations built small industrial encampments for their workers adjacent to the oil fields. While North American managers lived in relative se-

curity, Mexican workers received the most dangerous, poorly paid, and unhealthy jobs (Santiago 2006). The petroleum companies refused to address these issues even after a major strike in the mid-1930s. In response to this intransigence, Cárdenas expropriated the petroleum industry on 18 March 1936. Henceforth, Mexican bureaucrats and union leaders governed the extraction of oil.

Post-revolutionary land reform also changed the way land was used in Mexico. In the states of Morelos, Yucatán, and Durango, for example, the commercial and oftentimes intensive use of the land ceded to small-scale peasant agriculture. Land reform also included territory that indigenous people had lost in forests, deserts, and jungles, some of which now became biocultural reserves. Some experts objected to redistributing delicate ecosystems to the rural poor, however. These concerns helped to inspire the 1926 Forest Code, which required all logging in land-reform communities (*ejidos*) be carried out by producers' cooperatives, subject to oversight by the national forest service. These rules were ignored until the Cárdenas administration, which created an independent cabinet-level Department of Forestry headed by Quevedo. Prior to 1935, there were only six cooperatives in the entire nation; in the following five years, 860 more were created, accounting for nearly two-thirds of woodland *ejidos*. The cooperatives encountered a number of difficulties but nevertheless represented one of the world's first experiments in community forestry.

Cárdenas was the first president to emphasize natural resource conservation. His administration established the majority of the nation's national parks and undertook scientific research in Lake Pátzcuaro and the Pacific Ocean with the objective of making fisheries more sustainable. His administration launched an impressive number of infrastructure projects (including roads, electric lines, and water projects), most of which targeted the countryside. In essence, the administration sought to organize society and the landscape mutually, in a way that made each dependent on the other (Boyer and Wakild 2012). Unfortunately, this holistic vision of development confronted a third revolution soon after its appearance: the so-called Green revolution that applied cutting-edge technology to peasant agriculture but ended up favoring commercial and increasingly industrial use of the land.

The modernization of the Mexican countryside in the second half of the twentieth century led to the permanent conversion of forests to an increasingly industrialized form

of agriculture. Mechanized farming and irrigation grew rapidly in the river valleys of the northeast, including the Yaqui Valley of Sonora. This ancestral land of indigenous people and (more recently) a US land colonization company was home to the Green Revolution in 1943 and soon became one of the nation's richest agricultural zones. New varieties of corn and, later, wheat were explored; some grew rapidly thanks to irrigation and the application of synthetic fertilizers and pesticides. In the 1950s, these productive technologies were exported to India and the rest of the world. Other experiments in resource-intensive development soon followed, most importantly the so-called River Commissions established in the Papaloapan, Balsas, Fuerte, Grijalva, Pánunco, and Lerma/Chapala Watersheds that built dams, irrigation districts, and transportation networks. The commissions also funded public health and educational services. Despite their populist aura, they put water and land at the disposition of private corporations that ignored the needs of peasant producers. The spirit of "developmentalism" encouraged the federal government to make concessions of forestlands and other natural resources to private interests as well.

The state-owned petroleum company, PEMEX, also grew rapidly in the mid-twentieth century. Although it looked after the economic wellbeing of its workers (and administrators), it took much less heed of the environment. Inept management and inadequate investment in technology are to blame for an abysmal environmental record that includes the Ixtoc I oil spill in the Gulf of Mexico, which harmed human and nonhuman habitats.

The Green Revolution's model of economic development was transformed, beginning in 1980, by neoliberal policies. Mexican producers were exposed virtually overnight to the global economy, with devastating environmental and social consequences. Neoliberalism ignited an intense competition between domestic interests and international corporations over the use of natural resources such as minerals, beaches, and sources of hydro-electricity. Mexico's strategic location directly south of the United States has facilitated economic linkages via ports and railroads, but also illegal activities such as narco-trafficking. Thousands of acres of forests and former croplands are now used for marijuana and opium poppy production, at great cost to the environment and to rural people's personal security.

None of Mexico's revolutions—whether political, social, or agricultural—completely effaced its predecessors. Indeed, they often set the stage for a subsequent revolution. The advocates of the Green Revolution confronted a social panorama that included land-reform beneficiaries, rural workers, and indigenous people who benefited from the social revolution of 1910, for example. Today, these same groups form the leading edge of a far-flung environmental movement that harks back to indigenous communal traditions. The consequences of generations' worth of social struggle over natural resources are manifested today in federal environmental legislation, scientific traditions, and the expansion of civil society. Many Mexicans today seek to renew the bond with their landscape and biocultural heritage (Toledo 2003). Perhaps a new environmental revolution is beginning to take form.

Selected Sources

- Boyer, Christopher R. and Emily Wakild. 2012. "Social Landscaping in the Forests of Mexico: An Environmental Interpretation of Cardenismo, 1934–1940," *Hispanic American Historical Review* 92, no. 1: 73–106.
- Cariño, Micheline y Mario Monteforte. 1999. *El Primer Emporio Perlero Sustentable del Mundo: La compañía Criadora de Concha y Perla de Baja California, S.A. y perspectivas para Baja California Sur*. La Paz: UABCS.
- Santiago, Myrna I. 2007. *The Ecology of Oil: Environment, Labor, and the Mexican Revolution, 1900–1938*. Cambridge: Cambridge University Press.
- Toledo, Víctor. 2003. *Ecología, espiritualidad y conocimiento. De la sociedad del riesgo a la sociedad sustentable*. México: PNUMA, Universidad Iberoamericana.
- Vitz Matthew. 2012. "The Lands with Which We Shall Struggle': Land Reclamation, Revolution, and Development in Mexico's Lake Texcoco Basin, 1910–1950," *Hispanic American Historical Review* 92, no. 1: 41–71.

Reinaldo Funes Monzote

The Greater Caribbean: From Plantations to Tourism

The Greater Caribbean is one of the few regions on the planet defined by a common interior sea, although some people, for geopolitical, historical, or cultural reasons, push its boundaries into the Atlantic. It was long defined by the plantation, which, dependent on African slave labor for nearly four centuries (itself a key factor in the process of globalization that began with the arrival of Europeans in the Americas), exported the so-called “colonial fruits.” In the Antilles (its name taken from an Old World legend), sugarcane production was the dominant agro-industry well into the twentieth century. Other tropical crops were also significant, though, such as the banana plantations that began to cover large areas of insular and mainland Caribbean at the end of the nineteenth century.

The environmental conditions of the northern tropics were key to the formation of agro-export economies, despite the region’s vulnerability to natural disasters such as hurricanes and droughts. Extensive areas of forest promoted the accumulation of humus in the soil and provided wood for fuel, for shipbuilding (in Havana, for example), and valuable timber exports (from places like Honduras, Belize, and the Dominican Republic).

In an era in which the seas were of paramount importance to European powers, the Greater Caribbean stood at the center of the Atlantic world as the most commercially dynamic area. The struggle against Spain’s hegemony in the New World led five European monarchies to occupy parts of the region starting in the seventeenth century. This turned the Caribbean into a continental crossroads in the colonial period, something that explains its subsequent political and biocultural diversity. The road to political emancipation started with the independence of Haiti (1804), followed by South and Central American nations (in the 1820s), the Dominican Republic (1844), and Cuba (1902). Starting in 1960, various English colonies began to acquire sovereignty. Nonetheless, diverse ties of colonial dependency persist to this day.

Sugarcane, which helped create the Caribbean slave plantation complex, dominated the plains and rolling hills, radically transforming their ecologies. Symbols of monoculture and economic specialization, plantations were essential to the birth of indus-

trial capitalism in Europe and the United States (Moya 2008). The role of livestock, however, as a source of food, draft power, and intraregional commerce (legal or otherwise), should not be forgotten. As pastures began to multiply in the nineteenth century, ranching became a significant source of environmental change.

The history of sugar plantations in the Caribbean started in Hispaniola, where the collapse of the indigenous population led to the introduction of African slaves who, along with Europeans, formed the basis of the new creole population. But it was in the Lesser Antilles, occupied by England and France from the mid-seventeenth century, that the real sugar revolution occurred. The prototypical case was Barbados, where monoculture took hold quickly from 1640. From there, the new production model spread to the majority of other islands with similar social, economic, and environmental characteristics. By the eighteenth century, Jamaica and Saint-Domingue (Haiti) had become the largest sugar producers. In 1789, the population of Saint-Domingue included 452,000 black slaves, 40,000 whites, and 28,000 free mulattos. Europeans



Figure 1:
Flor de Cuba sugar refinery. Lithograph by Eduardo Laplante, in *Justo Germán Cantero, Los Ingenios. Colección de vistas de los principales ingenios de azúcar de la Isla de Cuba*, Imprenta de Luis Marquier, La Habana, 1857. This sugary refinery was founded in 1838 near Matanzas, Cuba's main sugar-producing region in the mid-nineteenth century. At the time, the refinery, already mechanized, was one of the largest in the world, with 603 hectares, out of a total of 1,246, planted in cane. Its barracks, which stand out in the center of the image, was also one of the largest, housing 409 slaves and 170 indentured Chinese, and later adding 150 additional workers.

considered it the richest colony in the world. This lasted until the great slave rebellion broke out in 1791, which ended with the formation of the Republic of Haiti and brought the organic, preindustrial cycle of the Caribbean slave plantation to a close.

In addition to human and animal traction, non-Spanish colonies made widespread use of wind and waterpower. Their size and the limited resources stimulated innovation to address the consequences of rapid deforestation: for example, using sugarcane bagasse as fuel, fertilizing with manure, and building irrigation works (Watts 1987). But such measures could not avoid the distortions of excessive economic specialization in what Humboldt called the “islands of sugar and slaves.” Such European imprudence, he thought, inverted the natural order by prioritizing export crops over the production of basic necessities. Despite his warning, the idea of the tropics as a supplier of foodstuffs and raw materials to power the new industrial age was reinforced by the birth of mass markets and new economic, scientific, and social theories (such as social Darwinism).

Since the nineteenth century, the history of the Caribbean has been marked by the growing influence of the United States as a critical export market and supplier. Although this process has led to varying degrees of dependence, the ties it forged are generally characterized as neocolonial. Starting in the twentieth century, efforts to control yellow fever, whose introduction and spread was tied to the plantation boom, secured this hegemony. The confirmation of creole doctor Carlos Finlay’s 1881 hypothesis that a biological vector (the mosquito *Aedes aegypti*) was responsible for transmitting the disease occurred during the first US military occupation of Cuba (1898–1902). This scientific discovery was followed by sanitation measures that facilitated the completion of the Panama Canal in 1914, a landmark in the northern neighbor’s “conquest of the tropics” (McNeill 2010).

Following the Haitian Revolution (1791–1804), Cuba consolidated its position as the world’s largest sugar exporter by supplying the growing consumer market in the United States. The productivity of the slave-based sugar plantations on the western part of the island accelerated with the early adoption of steam power in the mills (1820) and the railroad (1837), making them pioneers of industrial agriculture in the tropics. Cuban sugar mills, which relied on slavery until it was abolished (1880–1886), expanded at the expense of forested areas, which offered soils with abundant organic material, fuel wood, and timber (Funes 2008).

At the beginning of the twentieth century, sugar production expanded rapidly as US corporations in Cuba, Puerto Rico, and the Dominican Republic constructed large-scale mills and sugarcane estates, partly by moving into areas where extensive forests remained. The previous form of itinerant production, in which sugar mills progressively sought out virgin areas, became ever more difficult as industrial technology upped the scale of production. This new stage, therefore, increasingly relied on the use of chemical fertilizers, agricultural mechanization, and hydraulic infrastructure, factors that caused hitherto unknown environmental problems.

The Caribbean sugar industry began to be dismantled in the mid-twentieth century, with the process continuing despite the stimulus felt in some quarters following the Cuban Revolution in 1959 and the redistribution of the island's export quota to the United States. Due to its commercial relations with the Soviet Union and the Communist bloc, Cuba maintained high levels of production until 1991. Its input-intensive production model, however, was impossible to sustain following the breakdown of its market and supplier. The abrupt drop in imports of fuel, agrochemicals, and machinery turned the island into a laboratory experiment regarding the potential effects of peak oil, and paved the way for promoting organic agriculture on a national scale.

Next to sugar, coffee was the second most important export crop from the Antilles during the period of slave plantations. Production boomed during the second half of the nineteenth century on islands such as Puerto Rico and in mainland locations such as Venezuela, Colombia, and Costa Rica. The agro-ecological context of coffee was more diverse than that of sugarcane, but the preference of cultivating mountainous areas tended to increase the problem of soil erosion. Other traditionally significant commercial products included cacao and tobacco. Small- and medium-sized farmers, as well as peasants, were important producers of these three crops.

Extensive banana plantations spread through the Caribbean regions of Colombia, Panama, Costa Rica, and Honduras from the end of the nineteenth century, and also on islands such as Jamaica. Powerful US companies ended up controlling extensive areas of cultivation as well as the trade networks that supplied the mass consumer markets to the north. Steamships, railroads, and technologies such as refrigeration overcame the challenges posed by the fruit's ripening process. The spread of disease, which affected the variety of banana demanded by consumers, accelerated the deforestation of cultivation areas and encouraged the application of chemical disease control methods, which

affected the health of plantation workers. Like sugar, bananas became an allegory of the Caribbean and of stereotypes about tropicality, epitomized by the pejorative phrase “banana republics” (Soluri 2006).

During the twentieth century, other export-oriented economic activities began to vie with the dominance of the plantation: important oil fields on the coasts of Venezuela and Trinidad; coal in Colombia’s Guajira peninsula; and iron, copper, gold, nickel, and bauxite extraction in countries like the Dominican Republic, Jamaica, and Cuba. These activities have had an impact on marine ecosystems, which also suffer from the effects of soil erosion, agrochemical runoff, and dumping of waste material. As industrialization and urban growth have increased marine pollution levels, modern fishing techniques have accelerated the decline of local fisheries.

With the exception of Caracas, only a short distance from the sea, the principal cities of all the mainland countries lie outside the Caribbean region. Nonetheless, the rise of industrial metabolism has encouraged the formation of large urban concentrations around island capitals, such as Santo Domingo, Havana, and San Juan. Urbanization has been driven by migration from rural areas and policies promoting industrialization and administrative centralization. Additionally, the increase in migrants from within the region and beyond was significant until the third decade of the twentieth century, when the tendency started to reverse.

The Caribbean became a principal tourist destination when petroleum-based revolutions in transportation opened up international travel beyond the privileged domain of elites from the industrialized world. Tourism in the region has long been tied to US interests; the steamships that exported agricultural products also brought down visitors. The main destination until 1958 was Cuba, particularly Havana. But from 1960, tourism really took off, with the boom of commercial aviation, mass tourism, and shifting tastes that favored sun and beach destinations. Given the importance of foreign investment in the sector, and the dependence on flows of visitors, mainly from the United States, Europe, and Canada, some consider tourism to be a new kind of “plantation economy.” The arrival of cruise ships, which bring in less revenue and generate waste, exacerbate the problem. Tourist enclaves have also affected ecosystems that had once been among the best preserved. While the tourist industry initially tended to ignore its own environmental impact, this has changed and environmental awareness is a growing part of the tourist phenomenon, as can be seen by the rise in ecotourism and ecological resorts.



Figure 2:

Airplane landing at Princess Juliana Airport, on the Caribbean island of Saint Martin (or Sint Maarten). Measuring only 87 square kilometers, the island is part of the Lesser Antilles and has been divided, since the seventeenth century, between France and the Netherlands. Its current population is about 85,000, which makes it one of the most densely populated regions in the world, with around 1,000 people per square kilometer. It also receives more than a million visitors per year. One of its main tourist attractions is the beach next to Princess Juliana Airport, on the Dutch side, where planes pass right overhead as they approach the runway. Source: Aurimas Adomavicius via flickr.

Due to the prolonged presence of plantations, Caribbean islands have some of the most degraded environments in the Americas. The threat that such degradation posed to continued agricultural production within small territories, along with climatic considerations, led to the creation of forest reserves as early as the eighteenth century. Since then, colonies and independent countries in the region have adopted measures to conserve their flora, fauna, and ecosystems, although such efforts are almost always too late or have a limited effect. During the second half of the twentieth century, the rise of the environmental movement and modern environmental practices has encouraged the expansion of protected areas.

While the decline of the plantation sector had serious social and economic consequences, it did reduce the pressure on the region's degraded agro-ecosystems. By contrast, the development of mining and of tourism has increased the risks to ecosystems that, due to their mountainous or coastal locations, tend to be more fragile. In

particular, those activities which dependent on seaside paradises are the most vulnerable to the risks that rapidly accelerating climate change could bring to the Greater Caribbean.

Selected Sources

- Funes Monzote, Reinaldo. 2008. *From Rainforest to Cane Field in Cuba: An Environmental History since 1492*. (Translated by Alex Martin). Chapel Hill: The University of North Carolina Press.
- McNeill, John R. 2010. *Mosquito Empires: Ecology and War in the Greater Caribbean, 1620–1914*. Cambridge: Cambridge University Press.
- Moya Pons, Frank. 2008. *Historia del Caribe: Azúcar y plantaciones en el mundo atlántico*. Santo Domingo: Ediciones Ferilibro.
- Soluri, John. 2005. *Banana Cultures: Agriculture, Consumption & Environmental Change in Honduras & United States*. Austin: University of Texas Press.
- Watts, David. 1987. *The West Indies: Patterns: Development, Culture and Environment Change since 1492*. Cambridge: Cambridge University Press.

Nicolás Cuvi

The Tropical Andes: Where Multiple Visions of Nature Co-exist¹

The Tropical Andes includes most of the mountainous areas of Bolivia, Peru, Ecuador, Colombia, and small parts of Venezuela, Chile, and Argentina, starting at elevations between 600 and 800 meters. Its biology, geology, and climatic zones are extraordinarily diverse. It is also the indigenous heartland of South America, with close to ten million indigenous people belonging to dozens of different ethnic groups. This indigenous population, and the close coexistence of multiple worldviews, which I identify in their most extreme incarnations as indigenous and *mestizo*, are key to understanding the environmental history of the Tropical Andes from the nineteenth century. Unlike other regions of the Americas, where the composition of the population is more homogeneous, or where indigenous peoples are more isolated, or where Afro-descendants predominate, the roads, cities, and countrysides of Ecuador, Peru, and Bolivia are densely populated by indigenous peoples speaking languages such as Aimara or variants of Quechua and living in close proximity to *mestizos*, or people of mixed race (Sichra 2009).

This proposition might seem problematic to those unfamiliar with indigenous worldviews. While some would rather refer to western “ideologies” and indigenous “traditions,” to me these words divide both ways of being and thinking; instead of trying to avoid otherness as the point of departure, they foment it. By contrast, the concept of “worldview” can be applied to any large group of people, in that it refers to ways of thinking and acting as well as ways of relating to the nonhuman world.

Likewise, this argument does not presuppose an essentialist or Manichean reading of indigenous and mestizo worldviews. Between these extremes there is a great deal of syncretism, mixing, and gradation, sometimes free-flowing and sometimes forced. And it goes without saying that there is a great deal of variation within indigenous worldviews, which in some places have been profoundly transformed.

Some of the key characteristics of the indigenous worldview include: the idea of the *Pacha Mama* (Mother Earth or Mother universe), which human beings are a part of rather than separate from; communal land tenure and productive systems (such as that named *ayllu*); relationships of exchange, bartering, reciprocity, and complementarity; indigenous justice; voluntary collective work for the benefit of the community (*mingas*); a high re-

1 English translation by Shawn Van Ausdal.

gard for work; an appreciation for traditional agricultural technologies. By contrast, in the mestizo worldview—inspired by modern philosophy and Western systems of government, and central to institutions such as the nation-state, the Church, *haciendas*, industries, and businesses—nature should be civilized and domesticated, land is a form of private property, and monetary exchanges are a good way to structure human relationships. Of course, there is also a lot of heterogeneity within the mestizo worldview. Some mestizo authors, José María Arguedas and Jorge Icaza, for example, even adopt an *indigenista* position. But the majority of mestizos share a way of thinking about nature that bears little resemblance to ideas such as the *Pacha Mama*. Political leaders, whether they be liberal or conservative, socialist or capitalist, from the left or right, have all promoted models of development that crush indigenous worldviews, sometimes even highlighting them as a source of cultural, technological, and economic “backwardness” or “underdevelopment.”



Figure 1:
Distribution of
the biomes in the
Tropical Andes
Source: Cuesta,
Postigo and
Bustamante
(2012).

These tropical mountains, where various ways of thinking coexist, are themselves heterogeneous. From the cold puna grasslands, *páramos* (high, tropical areas of vegetation), and glaciers, where clouds rest and condors reign, they quickly drop into cloud forests, whose emblematic species is the spectacled bear; from there the descent continues until they eventually reach hot and humid regions where jaguars, alligators, and boa constrictors thrive in forests. This biological diversity is largely the result of being located within the tropics, a large altitude gradient, and the collision of a cold and warm marine current at the equator, which generates dif-

ferent rainfall regimes to its north and south. While the highlands have long functioned as reservoirs of water for human consumption, irrigation, and hydroelectric power, páramos and cloud forests have recently acquired significance in terms of carbon sequestration. To the north, the mountains are younger and divide into three distinct branches separated by the Cauca and Magdalena River valleys. To the south, by contrast, the mountains are higher and wider, with features such as the nine hundred kilometer wide Altiplano of Peru and Bolivia.

The diversity of ecosystems across a large altitude gradient has influenced human settlement patterns. By means of their relationships of kinship and reciprocity, the Inca and other indigenous societies organized the exchange of goods between the highlands and lowlands. This form of complementarity, which has been described as a “vertical archipelago” (Murra 2002), continued during the colonial period and after independence, although under different political, social, economic, and cultural systems. For example, haciendas that extended from páramos to the lowlands incorporated a range of spaces into individual properties. Despite a settlement pattern that emphasized altitudinal niches, people have generally preferred to live in the highlands. In fact, three capitals, Bogotá, Quito, and La Paz, are located at elevations above 2,600 meters. It was also at such elevations where an ancient, dense population domesticated dozens of foodstuffs, such as the potato, quinoa, ulluco, and guinea pig, as well as llamas for fiber and traction; at lower elevations they domesticated sacred plants such as coca. All these life forms, such as the four thousand varieties of potatoes that currently exist, not only connect different mountain spaces, but are vital to the subsistence of local populations and illustrate their millennium-old relationship with nature.

* * *

The major environmental transformations since the nineteenth century have been the result of certain mestizo visions that have promoted the export of unprocessed raw materials and, in exchange, the import of manufactured goods, knowledge, and technology. This history has been characterized by boom-and-bust cycles of wealth generation and subsequent decline. Cinchona, an Andean tree whose bark contains antimalarial compounds, is an example of this kind of fleeting (and in this case recurrent) exploitation. The last boom occurred during World War II, when millions of pounds of cinchona bark were extracted from Andean nations. Figure 2 shows indigenous workers, under the

watchful eye of a US specialist, carrying bundles of the bark on a road that was built to open up new Andean territories for exploitation.

The transformation of the high Andean landscape from the nineteenth century, however, needs to be understood in terms of vertical complementarity rather than just local production. The production of guano, saltpeter, cacao, and tobacco in the lowlands, or coffee between one thousand and two thousand meters, pushed the highlands to specialize in gold or silver mining, wool production, foodstuffs, such as potatoes, for local consumption and regional markets, as well as to act as a labor pool by reason of its dense population. Conscious of the need to better connect highland and lowland regions, national governments constructed railways, which, in turn, added an additional layer of spatial differentiation based on the relative accessibility of the new forms of transportation.



Figure 2:
Cascarilleros
carrying cinchona
bark in Ecuador,
c.1944
Source: Courtesy
U.S. National Ar-
chives (photo no.
229-R-11119-5).

As the nations of the Tropical Andes intensified their commercial ties with the United States from 1940, they stopped producing highland crops that competed against imports, such as wheat. While the vertical archipelago was not completely lost as a result, it acquired continental dimensions in which technology, manufactured goods, and temperate foodstuffs arrived from the north. In turn, banana and oil palm plantations spread, and oil production, which occurs in the lowlands, sustained the growth of highland cities, such as Quito. Large-scale mining, especially for copper and gold, also

increased. Industries developed as well, especially in the textile and food-processing sectors. And road networks expanded at the expense of railways, consolidating national and international networks. In the late twentieth century, rural to urban migration contributed to the rapid, chaotic growth of cities.

The most significant environmental change over this period was widespread deforestation, which was driven by agriculture, ranching, forestry, and colonization policies (which, until recently, required clearing the forest to demonstrate legal possession). Many of these processes have been associated with the construction of access roads to mining and oil enclaves or with the opening up of the agricultural frontier. In 1850, for example, 80 percent of Colombia's Andean forests were still intact; by 2000, they had shrunk to less than 40 percent of their original cover (Etter, McAlpine, and Possingham 2008). Other recent environmental changes include the contamination of the water, soil, and air through the application of agricultural pesticides and fertilizers, and by the fumigation campaigns to eradicate coca and poppy cultivation; in the cities, fossil fuel consumption has caused significant pollution.

* * *

While mestizo worldviews have shaped these large-scale transformations, millions of indigenous peoples and their communities have continued to practice other forms of territorial appropriation. It is true that, over the second half of the twentieth century, agrarian reform and development policies contributed to the erosion of agricultural diversity—both the crops and the traditional practices that maintained them—as many indigenous peoples sought to increase their labor productivity and profits (Knapp 1991). Such developments, however, are not widespread.

Many indigenous people continue to emphasize reproductive strategies that are not simply rooted in economic maximization. From Ecuador to Bolivia, thousands maintain many different potato landraces as an adaptive mechanism to varied environmental conditions. To gain access to diverse crops, some even prefer to sharecrop, rather than rely on the market, even though it may end up costing them more. Although many indigenous people from Paucartambo, Peru, have adopted modern agricultural practices and produce for the market, they still maintain crop diversity and rely on practices that are not guided by the goal of economic growth (Zimmerer 1996).

Throughout the Andes, many farmers continue to grow crops on terraces and raise beds with hand tools rather than tractors; they eat guinea pig instead of chicken; they plant quinoa rather than flowers or broccoli; and they raise llamas instead of sheep. Rather than produce for a market economy, many indigenous farmers maintain traditional agricultural strategies because they are more resilient and ensure food sovereignty. They also still prefer communal, rather than private, ownership of the land.

There have been recent changes as well. Ecotourism and agroecological production have grown in rural and wild areas. In both the city and the countryside, new social movements have emerged, many of them a fusion of mestizo, indigenous, and some global-movement worldviews. By focusing on urban agriculture, food sovereignty, clean industrial production, and environmental justice, they propose new ways of living harmoniously with nature. Similarly, the ideas of *suma qamaña* and *sumak kawsay* (“good living”) have been incorporated into the constitutions of Bolivia and Ecuador as a result of the growing political influence of their indigenous movements, the recognition of multiculturalism, and the search for alternatives to the negative consequences of living on the margins of global capitalism. These ideas encourage ways of living beyond the logic of contemporary capitalism. By fostering greater connection with the earth and its rhythms, and focusing on community life, they promote the reproduction of life over the reproduction of capital. In accord with a worldview inspired by a belief in the *Pacha Mama*, these constitutions have also recognized the “Rights of Nature,” transforming nature from an object into a subject. Such efforts recover ancestral wisdom and assimilate it with contemporary knowledge as an alternative to development paradigms based on economic growth. In a decade or more, we will be able to see whether such efforts have moved beyond proclamations to reconcile the worldviews that coexist in the Tropical Andes.

Selected Sources

- Cuesta, Francisco, Julio Postigo, and Macarena Bustamante. 2012. „Área de estudio.“ In *Panorama andino sobre cambio climático: Vulnerabilidad y adaptación en los Andes Tropicales*, edited by Francisco Cuesta, Macarena Bustamante, María Teresa Becerra, Julio Postigo, and Manuel Peralvo. Lima: CONDESAN and SGCAN, 25–41.
- Etter, Andres, Clive McAlpine and Hugh Possingham. 2008. “Historical Patterns and Drivers of Landscape Change in Colombia Since 1500: A Regionalized Spatial Approach.” *Annals of the Association of American Geographers* 98 (1): 2–23.
- Knapp, Gregory. 1991. *Andean Ecology: Adaptive Dynamics in Ecuador*. Boulder: Westview Press.
- Murra, John V. 2002. “El control vertical de un máximo de pisos ecológicos en la economía de las sociedades andinas.” In *El mundo andino: Población, medio ambiente y economía*, edited by J. V. Murra. Lima: Pontificia Universidad Católica del Perú and Instituto de Estudios Peruanos, 85–125.
- Sichra, Inge. 2009. “Andes.” In *Atlas sociolingüístico de pueblos indígenas en América Latina*, coordinated and edited by Inge Sichra. Cochabamba: UNICEP and FUNPROEIB, 513–644.
- Zimmerer, Karl S. 1996. *Changing Fortunes: Biodiversity and Peasant Livelihood in the Peruvian Andes*. Berkeley: University of California Press.

José Augusto Pádua

Nature and Territory in the Making of Brazil¹

Following Brazil's beginnings as an independent country in 1822, the neighboring countries that emerged from the fragmentation of Spanish America largely accepted the official boundaries that had been negotiated in the eighteenth century by the colonial empires of Portugal and Spain. Even if most of those borders were fragile and sparsely populated, established more on maps than in reality, the new state of Brazil took on the huge territory of Portuguese America as its political inheritance. Occupying an area endowed with great diversity and ecological wealth, northern Brazil and the Atlantic coast from the Northeast to the South were distinguished by two magnificent regions of continuous rainforest: the Amazon Rainforest (originally extending to approximately four million km², if we exclude areas that were outside of Portuguese America) and the *Mata Atlântica* or Atlantic Forest (originally approximately 1.3 million km²). The area between these two forest complexes was covered by large swathes of different types of savannah, most notably the *Cerrado* savannah (approximately two million km²) and the *Caatinga* savannah (approximately 850,000 km²).

Human occupation of these spaces under Portuguese colonization was sparse, fragmented, and uneven, being concentrated in the area running between the northeastern and the southeastern Atlantic coast. The coastal area was used for agricultural activities, especially plantations and sugar mills, and featured a number of small towns and administrative centers. Settlements based on cattle ranching emerged in the savannahs of the midwest and northeastern zones of the hinterland regions known in Luso-Brazilian culture as the *sertões* (backlands; wilderness zones). An important historical and environmental factor, therefore, was the spatial separation between agriculture (based on burning tropical forests) and cattle farming in the savannahs of the country's interior, which hindered the spread of mixed-production farming and the use of animal manure as fertilization.

In a few regions of the colony's interior, especially in the midwestern parts of the territory, gold and diamond mining gave rise to more intensive and demographically significant processes of economic settlement. The mining economy was very important up until its decline in the late eighteenth century. The mining activities took place on an extensive basis, exploiting the superficial layers of gold on the hills and margins of the rivers through the use of rudimentary and environmentally destructive techniques.

1 English translation by Rocky Hirst.

Once these superficial layers were exhausted, the sites were abandoned. In the course of the nineteenth century, the economy of these regions was mainly converted to cattle-ranching and small-scale agriculture.

Settlements in Amazonia, which had a population of approximately 150,000 at the time of Brazil's independence, were centered along the course of the Amazon River and featured low-intensity economies based on the extraction of native flora and fauna and the cultivation of some agricultural products, especially cocoa. The population of the country as a whole was also relatively small—approximately four million people in 1822, and 17 million in 1900—although it should be noted that nineteenth-century population figures for the Amazon and Brazil in general are unreliable, especially since they exclude indigenous populations living in the vast spaces unoccupied by neo-European societies. In any case, these free indigenous populations, even if they were living inside the formal boundaries of the Brazilian territory, were not part of “Brazil” as a political entity.

What did exist of socioeconomic life in the great territory considered as belonging to Brazil, therefore, was a mosaic of settlements controlled by local elite groups and supported by various practices for harnessing natural resources. These practices were generally based on technological methods that were rudimentary and paid no heed to the conservation of these resources. Within the more densely inhabited areas, new local populations were beginning to form as the result of increased interaction and physical and cultural intermixing between detribalized indigenous populations, current and former African slaves, and workers of European origin. A vibrant mixture of popular cultural practices developed, in spite of the oppression, inequality, and elitism of the social order marked by the prevalence of slavery. Around these more densely populated settlements, on the other hand, lay huge swathes of bushland or “land banks” (*fundos territoriais*, large areas of bushland which were earmarked by the local elites as having economic potential) with very little neo-European occupation. In these areas, indigenous people continued to exist with considerable freedom, often interacting with communities of runaway slaves (known as *quilombos*) and small-scale extraction workers and smallholders who had chosen the greater autonomy of life in these remote regions (Ribeiro 2000).

All told, we can say that the central political imperative of the Brazilian monarchy, which lasted between 1822 and 1889, was to maintain the political unity of this huge territory. Elites viewed the sertões as a space that was socially barren, but endowed with great potential for future economic benefit. The unity of the country was threat-

ened on several occasions, but was ultimately maintained by political agreements between regional elites and the monarchy that endeavored to engender trustworthy allies through conservative policies and the invention and promotion of symbols of national identity.

Even with the end of the monarchy in 1889, denser settlement remained restricted to discrete regions dominated by local elites. Until the mid-twentieth century, the overwhelming majority of the territory was covered by forests and native ecosystems. The exception to this was the Atlantic Forest, the settlement of which increased greatly in the first half of the twentieth century. This was made possible by the spread of the railways, which made agricultural areas newly accessible, and new colonization projects with immigrant farmers from Germany, Italy, Poland, Japan, and elsewhere.

Despite limited anthropization in the territory as a whole, a rich intellectual tradition emerged from the late eighteenth century that was critical of the destruction of soils and forests in zones of high economic production, in which there was still reliance on destructive models of resource use inherited from the colonial past. The vast dimensions of the territory played a part in the careless exploitation of natural resources, since they conjured up images of boundless nature, an endless frontier open for the advance of the economy. This perception, that haphazard rapid exploitation was justified by the sheer abundance of nature, caused conservation methods to fall by the wayside (Pádua 2010). However, some intellectuals and scientists observed the negative environmental consequences of this exploitation at the local level and predicted that in time it would destroy the natural resources that were such a major asset in the nation's future progress. They eloquently argued for the introduction of more scientific methods of land use and stewardship.

A striking example of the harmful effects of exploitative economic practices on a regional level was the ecological destruction of the central valley of the Paraíba do Sul River, an area covered by forested hills between the cities of Rio de Janeiro and São Paulo. Between 1820 and 1890, export coffee plantations in this region—characterized by their large size and by their reliance on slave labor—dominated the Brazilian economy and sustained the Rio de Janeiro-based monarchy. But the intense burning of forests, erosion of hillsides, and soil degradation prevented the continuation of coffee production in the region, fuelling an economic crisis in the early twentieth century that would influence both the declaration of the Brazilian Republic, and the establishment of new coffee zones in the western part of the state of São Paulo (Dean 1995).

Another notable process of economic territorialisation in the late nineteenth century was the so-called “rubber boom” from 1850 to 1915, when the export of rubber extracted from native rubber trees in the Amazon forest met the majority of the demand in industrializing countries, especially that of the automobile industry. However, in terms of deforestation, the rubber boom had a limited impact. This was largely due to the biophysical characteristics of the native rubber trees. The extraction of rubber did not require these trees to be cut down: rather, in order for rubber be produced during an effective time frame, the extraction process required the maintenance of not only the rubber trees but also the surrounding forested landscapes, which acted as ecological support for the continuation of rubber trees’ productivity. While it is true that demand for rubber was the cause of a marked increase in migration to the Amazon and the rapid growth of cities such as Manaus and Belém, the swift decline of Brazilian rubber exports as a result of the increasing international dominance of rubber sourced from plantations in Southeast Asia meant that the environmental consequences of rubber extraction as a whole were not severe. Up until the early 1970s, the Brazilian Amazon Rainforest still covered approximately 99 percent of its original area (Pádua 1997).

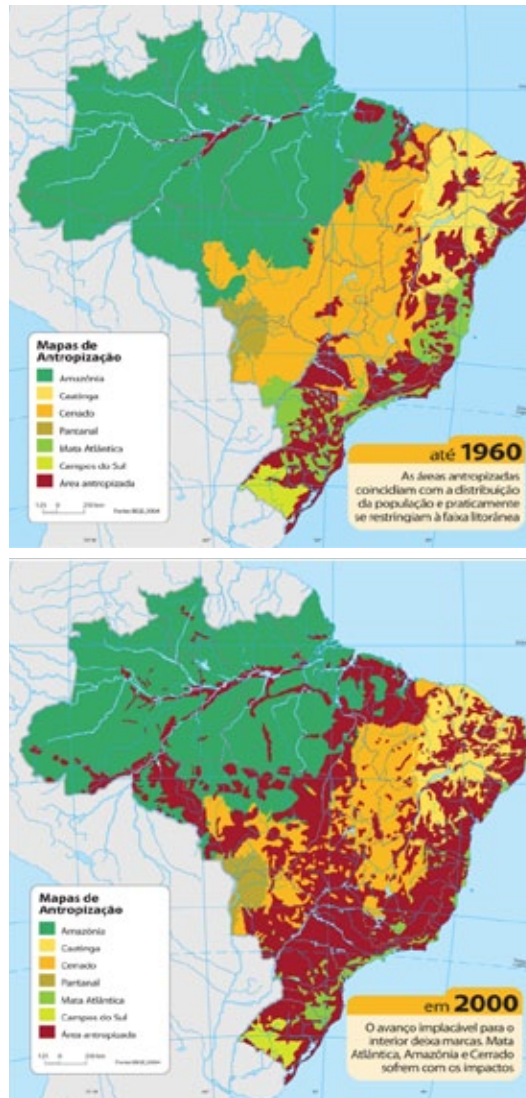
The most significant transformations in rural and urban landscapes in Brazil began in the mid-twentieth century, as part of a broader process of social and economic transformation. A political revolution which occurred in 1930, known at the time as the “New Republic,” sparked a wave of urbanisation and industrialisation which continued through the following decades. Brazil’s population increased from 41 to 186 million between 1940 and 2010. In the same period, the urban population increased as a proportion from 31 percent to 84 percent. These socioeconomic and geographical changes became more evident in the period following World War II, and gained particular momentum during the 1964–84 military dictatorship. The authoritarian state, dominated by a geopolitical obsession with accelerated development and the economic occupation of the remoter areas of the territory, stimulated significant developments. Firstly, it facilitated the expansion and remodelling of urban landscapes, leading to increased pollution levels and the destruction of traditional architectural complexes. Secondly, it drove the expansion of infrastructure, especially dams and motorways. Thirdly, it encouraged the spread of industrial areas and the dumping of toxic substances. Fourthly, it allowed the reclamation of new areas for cattle farming in areas previously covered by tropical forests and other native ecosystems. Many of these areas were also occupied by scattered populations of Indians, fishermen, Brazil nut harvesters or rubber tappers, and other poor communities without formal land rights. Fifthly, the state encouraged the conversion of areas formerly used by small-scale traditional agriculture—in which a significant

rural population lived in informal settlements on large private estates, with part of their income going to the landowner—into large units of agribusiness based on the use of machines and agrochemicals.

The impact of these factors on the Brazilian landscape are shown in Figure 1 and 2, which demonstrate the process of anthropization of the major biomes up until 1960, and between 1960 and 2000.

It is not difficult to imagine that these changes had a strong environmental impact and sparked various conflicts involving both rural and urban communities. The Atlantic Forest has largely been destroyed, possessing today around nine percent of its original cover. The Amazon Rainforest was also heavily deforested from the mid-1970s onwards, leaving today about 80 percent of its original cover. The Cerrado, the vast savannah of central Brazil, was used for agriculture from the 1970s onwards as a result of agronomic research that succeeded

in modifying the natural acidity of its soil, making it one of the major agricultural frontiers of the contemporary world, especially for the production of soy beans. With this, the Cerrado has lost about 50 percent of its native vegetation in only a few decades. In urban areas, a rapid, widespread population increase, driven by the exodus of rural people largely



Figures 1 and 2. Illustrations by William Torre, 2009, based on maps from the Brazilian Institute of Geography and Statistics, IBGE.

displaced by agricultural mechanisation, created a number of *favelas* (shanty towns) and added to the growing number of factories, concrete buildings, and vehicles, creating cities that are polluted and environmentally degraded. Despite advances made in recent years, about 38 percent of urban dwellings have no access to sewerage systems and overall, about 63 percent of sewage is not treated.

As a result of these issues, and especially the destruction of the Amazon Rainforest, Brazil has become one of the key players in the international ecological debate, a position that has been made visible by Brazil's convening of the United Nations Conference on Environment and Development in Rio de Janeiro in 1992. On the other hand, the significant increase in environmental struggles in Brazil starting in the 1970s—including conflicts that have acquired global notoriety, such as the assassination of rubber tapper trade union leader Chico Mendes in the Amazonian state of Acre in 1988, one of the landmarks in the emergence of the so-called “environmentalism of the poor”—has helped to increase the political strength of the debate on the environment and sustainability in the country (Pádua 2012). The political consequences of these debates and social struggles have come to be seen as historically relevant, to the extent that environmentalism has taken on a prominent, if ambiguous role in the coalition of left-wing and centrist political forces that have been in power since 2003, under the leadership of the Workers' Party. One significant change has been the 84 percent reduction in the annual rate of deforestation in the Brazilian Amazon between 2004 and 2012. But we must also consider that the destruction of the Cerrado provoked by the expansion of agribusiness has turned that region into a “sacrificial zone” for the conservation of the Amazon Rainforest. The destruction of the Cerrado is meeting little or no national or international resistance. The public's fascination with tropical forests in contemporary culture has not extended to the savannah environment, despite these being endowed with considerable biodiversity and providing essential ecological services.

The challenge that currently presents itself, therefore, is to understand the historical background summarized in this essay on a deeper level, and to link this historical knowledge to current political debates and disputes over the future of Brazil's complex society and its immense territory. In spite of its many problems and challenges, Brazilian society is culturally and politically vibrant and is trying to find its own way towards a better life. Looking beyond the borders of Brazil itself, we are reminded that the Brazilian territory has ecological riches on a truly global scale, and the future trends of Brazilian history have a critical role to play in the fate of humanity and its environment in the twenty-first century.

Selected Sources

- Dean, Warren. 1995. *With Broadax and Firebrand: The Destruction of the Brazilian Atlantic Forest*. Berkeley: University of California Press.
- Pádua, José Augusto. 1997. "Biosphere, Conjuncture in the History and Analysis of the Amazon Problem." In *The International Handbook of Environmental Sociology*, edited by Michael Redclift. London: Edward Elgar, 403–17.
- . 2010. "European Colonialism and Tropical Forest Destruction in Brazil." In *Environmental History: As If Nature Existed*, edited by John R. McNeill, Jose Augusto Pádua, and Mahesh Rangarajan. New Delhi: Oxford University Press, 130–48.
- . 2012. "Environmentalism in Brazil: A Historical Perspective." In: *A Companion to Global Environmental History*, edited by John R. McNeill and Erin Stewart Mauldin. Oxford: Wiley-Blackwell, 455–73.
- Ribeiro, Darcy. 2000. *The Brazilian People: The Formation and Meaning of Brazil*. Miami: University Press of Florida, 2000.

Adrián Zarrilli

The La Plata Basin: Rivers, Plains, and Societies in the Southern Cone¹

*...just as the men of other lands worship the sea and can feel it deep inside them, the men of ours (including the man who weaves these symbols) yearn for the inexhaustible plains that echo under the horses' hooves. – Jorge Luis Borges, "The Dead Man"*²

*The smell of those rivers is like no other on earth. It is the smell of primeval beginnings, the dank smell of things painfully taking shape, caught in the very process of growing. – Juan José Saer, *The Witness**³

Let us begin with Jorge Luis Borges who, in the epigraph, highlights one of the two main protagonists of the history of this region: a society that has long had to relate, in ways often estranged or purged of any trace of nostalgia, to the immensity of the world around it. Borges himself, speaking through the figure of the *gaucho*, the cowboy of the South American grasslands, describes the plains environment as inexhaustible and "elemental," almost "secret." The plains are traversed by the other main protagonist, the rivers, which to Juan José Saer smell of primeval beginnings, of the very process of growing.

The La Plata River Basin is a complex network of people, plains, and rivers that covers over three million square kilometers. It spreads across southern Brazil, southeastern Bolivia, most of Uruguay, all of Paraguay, and much of central and northern Argentina. It contains three important river systems: the Paraguay, Paraná, and Uruguay. The latter two merge to form the La Plata River, an estuary that drains into the southern Atlantic. Additionally, the basin includes tributaries that originate in mountainous areas and flow latitudinally until they meet up with the mighty rivers of the plains, such as the Paraguay River, which flow south, gathering water filtered by enormous wetlands.

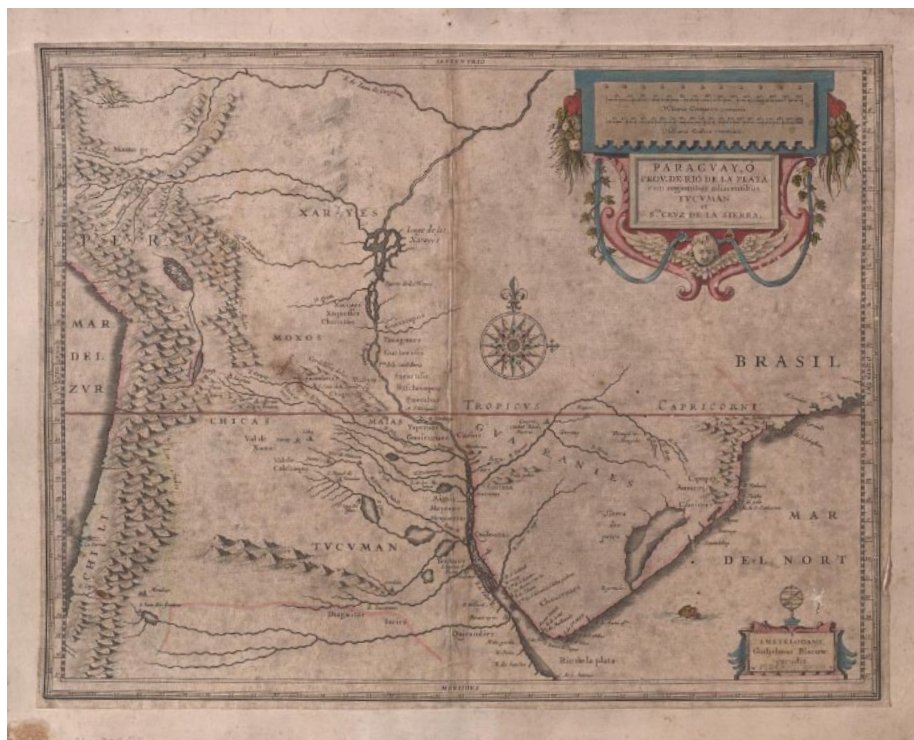
This macroregion is comprised of several exceptional biomes. To the north lie the dry Quebracho forests and other landscapes of the Gran Chaco. Nearby is the Pantanal, the gigantic expanse of wetlands shared by Brazil, Bolivia, and Paraguay in the upper drain-

1 English translation by Shawn Van Ausdal.

2 Jorge Luis Borges, *Collected Fictions*, trans. Andrew Hurley (New York: Penguin Books, 1999).

3 Juan José Saer, *The Witness*, trans. Margaret Jull Costa, (London: The Serpent's Tail, 1990), 22.

Figure 1:
Map produced in 1616, which indicates the way in which the La Plata Basin was perceived as a territorial unit. This map is the work of Willem Blaeu (1571–1638). Original title: “Paraguay, or prov. Rio de La Plata, Tucuman et cum adiacentibus regionibus Santa Cruz de la Sierra” Source: http://objdigital.bn.br/acervo_digital/div_cartografia/cart527467.jpg



age area of the Paraguay River. Connecting the Pantanal and the Paraná Delta (where the Paraguay River flows into the La Plata River) is another enormous network of highly biodiverse wetlands. The other biome of global importance in the La Plata Basin, given its size, is the Pampas.

To consider this basin as an integrated region is nothing new; it was envisioned in this manner from the outset of European colonization (see Figure 1). This perspective, however, was lost with independence and the subsequent formation of nation states. One of the principal contributions of environmental history has been to champion alternative units of analysis, such as the watershed, which allow us to understand complex processes that extend beyond political borders.

The historical importance of the basin for Latin America, and for the Southern Cone in particular, stems from its vast array of environmental resources, which have provided the

basis for the largest human settlements in South America. It contains one of the world's largest reserves of fresh water, as well as tremendous biological and cultural diversity. The basin's complex of rivers and lakes also constitute the principal recharge system for the Guarani Aquifer, one of the largest subterranean reserves of water in the world.

The social history of this region has been intrinsically tied to its landscapes and their transformation. Based on socio-environmental parameters, this article divides the history of the La Plata River Basin into three overarching periods, with European conquest, the late-nineteenth century, and the mid-twentieth century being the key moments of change in a process of intensifying natural resource use.

Beginnings

Our story begins with the transformation of the basin environment by European conquest and settlement. Of particular importance was the introduction of new plants and animals that thrived in ideal conditions in the plains. One of these, free-ranging cattle, progressively became the region's principal resource, sustaining much of its economic and social activity through at least the mid-nineteenth century.

During this period, the most significant phenomenon throughout the region, from southern Brazil to the Pampas, was the development of export-oriented ranching based on local breeds. The growth of this activity stimulated the expansion of other sectors, both in the towns and in the countryside. As the export industry became increasingly specialized, demand grew for transportation and marketing services that connected rural businesses to North Atlantic markets. The income generated by the export of livestock products from Argentina, Brazil, and Uruguay helped to increase the size of their domestic markets, generating greater demand for goods and services. From Rio Grande do Sul to Buenos Aires, the growth of this territorially extensive activity laid the foundation for the organization of nation-states as well as the subjugation of the rural population that had lived in these regions since the colonial period. Out of this population arose the *gaucho*, who has played such a fundamental role in the configuration of national (and sometimes regional) identities and, given a mutually interdependent relationship with the environment, endowed its spaces with a unique character (Garavaglia, 1992).

Ruptures

In the last quarter of the nineteenth century, the development of capitalist agriculture and the strides made in the nation-state building enterprise initiated what could well be the most important period of environmental transformation to affect La Plata Basin as a whole. Alfred Crosby's concept of "Neo-Europes," from his classic book, *Ecological Imperialism*, succinctly captures the major forces driving this change. More than 11 million immigrants, mostly from southern Europe, settled within the basin, dramatically transforming its social and productive systems. Between 1850 and 1930, Argentina took in close to six million Europeans. In the context of growing demand for primary products by North Atlantic economies, these immigrants radically modified the Pampas by raising massive herds of sheep (the basis of Argentina's capitalist expansion). They also transformed the grasslands by planting new species of forage, which permitted the development of high-quality beef production; and they greatly expanded grain production. All the while, the formation of the modern state allowed the elites who dominated these key productive sectors to monopolize much of the economic benefit. Likewise, Brazil received almost five million immigrants, most of whom settled in the southern part of the country, where they provided the impetus for a similar process of economic modernization.

The combination of modern ranching and agriculture unleashed formidable economic, social, and environmental changes: the plowing up of land on a massive scale, the introduction of new species, the expansion of the agricultural frontier, remarkable population growth, the dramatic extension of railroad networks, and the proliferation of industrial crops. Stimulated by external demand, these dynamic processes encouraged the rapid occupation of much of the La Plata River Basin, and contributed to a significant reduction of its former environmental heterogeneity.

They also encouraged the incorporation of territories ill-suited to such activities, with important social and environmental consequences, such as erosion and overproduction. The staggering growth of Argentina's railway network, for example, illustrates these interconnected processes. Driven by the expansion of ranching and agriculture, and the need to transport their produce, more than forty thousand kilometers of track were laid within 40 years. The creation of this railway network, in turn, contributed to the transformation of the landscape: the growth of new cities and towns, cases of intense deforestation (to pro-

vide sleepers and fuel for the railroads), and, ultimately, the formation of a new territory with a new set of socioenvironmental problems (Adamoli and Fernández 1980).

Transformations

From the mid-twentieth century, a new productive rationality has taken root in the La Plata Basin. Critical social and environmental factors, which require us to ponder the changes taking place in the macroregion, include the rapid industrialization of many subbasins, with a stark concentration of the population into a small number of areas; numerous hydroelectric projects (the dams of Itaipú, Yaciretá, and Salto Grande, among others), which drastically transform the landscape and the hydrological balance; the extension of the agricultural frontier along with the development of industrial agriculture (see Figure 2); rising levels of deforestation; the massive application of agrochemicals and the contamination of the region's waterways; and the abandonment or expulsion of peasant populations, who have been driven to the cities (Pengue 2008).



Figure 2: Picture of massive deforestation as soy cultivation advances. The expansion of the agricultural frontier is a real threat to the forests of the Gran Chaco, South America. Photo courtesy of Guyra Paragua.

The growth of industrial agriculture throughout the different environments of the basin has eliminated forest cover that was critical to maintain healthy ecosystems and hydro-

logical systems. As deforestation rates began to accelerate toward the end of the last century, the forests of Brazil, Argentina, and Paraguay were drastically reduced. Soils cleared of native vegetation and turned into farmland have suffered from compaction and erosion. Overall surface runoff has increased both overall and in pace, swelling the peak discharge of rivers and driving up sedimentation rates. This, in turn, has impacted river navigability and exacerbated the silting up of dams, reducing their capacity to generate energy.

Agricultural and livestock production has made this region famous throughout the world. The plains have been, and continue to be, the basis on which such activities develop. The Pampas of Argentina is the leading ranching region, followed by the northeastern part of the basin. Together they contain 85 percent of its cattle stock—46.5 million head out of a total of 55 million. Soy is the main oilseed crop, occupying the most fertile lands of the Pampas as well as the former cattle fattening grounds to the west and the agricultural zones of Northeastern and Northwestern Argentina. In 2000, Argentina's soy harvest was almost 20,207 million tons, all of which was produced within the basin. Its grain-producing area also lies mostly within the region, and at least half of its wheat production occurs there (Zarrilli 2010). Similarly, Uruguay's best agricultural lands, which account for all its cereal and oilseed production, lie within the basin. And Brazil has become the world's second largest soy producer, after the United States, by expanding soy production into the Cerrado (an extensive biome of tropical savannas covering almost two million square kilometers).

Eastern Bolivia and Paraguay produce cotton, sugarcane, and soy. They are also known for cattle breeding and abundant freshwater fisheries, which include tiger shovelnose catfish, pacu, and, in the Pilcomayo River, sabalo. Soy production has become critical to both economies. In 2008, oilseeds and their byproducts amounted to 78 percent of total agricultural exports, including timber (which occupies third place), for a value of US\$382 million (Salas-Dueñas and Facetti 2007). The significance of this crop throughout the basin has led to the growth of an enormous green stain of monoculture that some analysts identify as the "Republic of Soy."

The cost of this environmental transformation, however, has been profound. Over the last half century, the La Plata Basin has experienced mega-energy projects, poorly planned road networks, and waterways regulated only for commercial ends (with

negative environmental consequences). In addition, overfishing, excessive floodplain grazing, deforestation, fires, and the general lack of integrated wetland management have all led to widespread degradation and the loss of ecosystems and their vital resources.

The fertility of its soils, the wealth of its mineral resources, and its valuable forests (themselves quite diverse) has made the La Plata River Basin the most developed and populated region (with over 100 million people) in South America. It contains 57 cities with over one hundred thousand inhabitants apiece (including the capitals of four countries—Buenos Aires, Brasilia, Asunción, Montevideo, and Sucre, the administrative capital of Bolivia) and is responsible for 70 percent of the GDP of these countries.

As this historical overview suggests, the future of the La Plata River Basin will depend on the ability of its different societies and communities to devise creative, cooperative, and sustainable programs of regional integration that safeguard the region's biological and cultural diversity.

Transverse Histories

Claudia Leal

Rainforest Frontiers¹

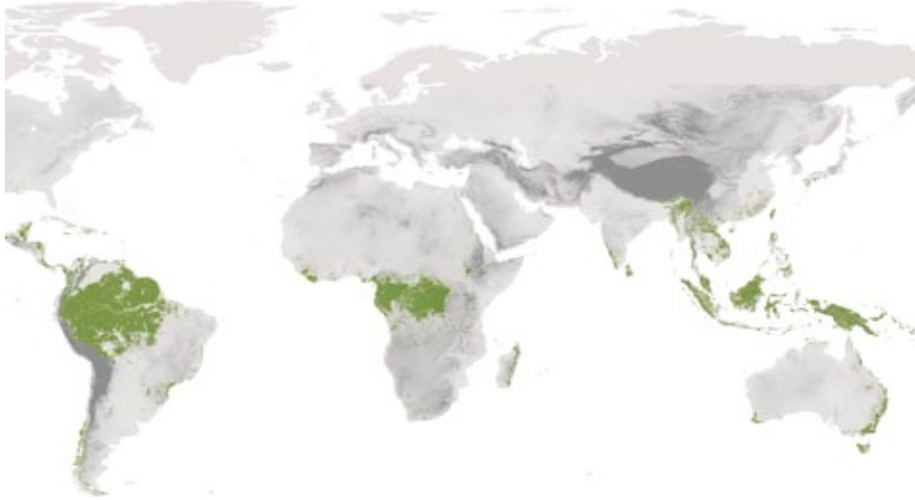


Figure 1:
Tropical Rainforest
Cover. Based on
The Global Map-
ping Project (Land
Cover Data). Car-
tography by Paola
Luna.

Humid tropical forests cover two-fifths of Latin America and the Caribbean, representing almost half of the world's total of this biome (see Figure 1). Although significant tracts of these forests have disappeared, their history goes well beyond the much discussed deforestation that gathered such momentum starting in the 1960s and 70s. The extraction of timber and other resources, such as rubber, has altered the structure of some forests by depleting the species of precious woods and multiplying rubber trees (*Hevea spp.*). The search for valuable natural resources lured settlers into areas once populated only by ancestral indigenous groups, drawing these territories closer to the societies that laid claim to them. Since Independence, the formation of nation-states in Latin America has advanced, to a large degree, by incorporating territories that the Spanish and Portuguese empires did not control. The resulting spread of plantations and peasant plots, of railroads and trails, has dramatically altered local landscapes. Tropical rainforests are the last frontier in this long process of expansion, the only place where so-called “uncontacted” groups of people still exist. But despite efforts to nationalize these vast forested domains, as shown by the proliferation of towns and local governments, their incorporation remains elusive. Partly because of their exuberant vegetation and the existence of exotic

1 English translation by Shawn Van Ausdal.

indigenous groups, they endure as regions considered distant and alien. These humid forests appear to be perpetual frontiers, territories defined by their marginality.

Among these rainforest frontiers, the Amazon stands out as the world's largest. Nine countries share this vast territory, 60 percent of which is located in Brazil. There is a second bloc of tropical rainforests, much more fragmented, that starts from the Pacific coast of northern South America, crosses Central America, and reaches into southern Mexico. The largest tracts of this forest are found in the Yucatan peninsula and in the so-called Biogeographic Chocó (that is, the Pacific coast of Colombia and parts of Panama and Ecuador). Latin America's third bloc of humid forest is the *mata atlántica* (Atlantic Forest). Originally extending along the Brazilian coast from the northeast to Uruguay, only 8.5 percent of the forest remains today. Its southern tract, where araucaria trees dominate, is considered semitropical since it tolerates cooler temperatures as well as lower levels of precipitation.

Today about 85 percent of the forests in the region are tropical rainforests. The remaining 15 percent are either found in the Andes at an altitude of over 1,000 meters, in temperate areas (in Chile, Argentina, and Mexico), or are dry tropical forests. The latter are the rarest and include, among others, the remnants of the Brazilian *Caatinga*, characterized by short, deciduous trees and spiny shrubs. By contrast, tall evergreen trees predominate in rainforests. This biome is found in the lowland tropics where annual rainfall is high (between 2,000 and 3,000 mm) and the dry season is short (between one and four months). In the Upper Chocó, though, it rains more than 10,000 mm per annum, making it one of the rainiest places in the world. Such variations in rainfall, as well as soil types and dominant tree species, characterize the differences that exist between one rainforest and another.

Rainforest regions have a long history, starting well before 1800. Occupied by humans for millennia, they experienced important changes as a consequence of European colonialism. The demographic collapse of Amerindian populations caused profound social ruptures and contributed to changes in vegetation. In some parts, such as the lower Amazon River Basin, a few relatively marginal plantation economies developed and the extraction of natural resources for external markets got underway. These forest products, known as *drogas do sertão*, varied enormously: sarsaparilla, vanilla, cinnamon, manatee meat and oil, turtle shells, and feathers were among the most

important. While this trade did not cause significant deforestation, it did have other environmental consequences, such as the sharp decline in turtle and manatee populations. In a similar fashion, economies based on natural resource extraction developed in other rainforest regions. For example, in 1750, the Caribbean coast of what is today Nicaragua also exported sarsaparilla and turtle shells in addition to mahogany. To the south, the alluvial mines of Colombia's Pacific region became the principal source of New Granada's gold exports during the eighteenth century, well anticipating the recent wave of mining prospecting and exploitation.

The extractive economy, which began timidly during the colonial period, burgeoned during the second half of the nineteenth century and the first half of the twentieth century. The industrial revolution generated demand for raw materials, some of which could be derived from rainforest plants. The rubber boom, which took place primarily in the Amazon but also extended through the forests of Central America, is the quintessential example. There were other important booms, though they tended to affect very specific regions, such as that created by the demand for tagua, or vegetable ivory—the seed of various palm trees that grow in the forests of the Pacific coast between Panama and Ecuador—which was used to make buttons before the invention of plastic. In the case of the Petén Basin of Guatemala, the tapping of chicle, once the principal ingredient in chewing gum, also illustrates how natural resource extraction restructured regions during the boom period and, following the development of industrial substitutes, dramatically declined. In the forests of Central America's Caribbean coast, as exemplified by the case of Belize, logging precious woods and dyewoods was of great importance. But even more significant during the first half of the twentieth century was the expansion of banana plantations in old-growth rainforests.

Many of these activities did not generate widespread deforestation. Rubber offers a case in point. Rubber tappers in the Amazon cleared trails through the forest to connect one or two hundred *Hevea* trees that produced white rubber, the finest on the market. Every day they collected the latex excreted from incisions made on the trunk the day before. These tappers improved their trails by caring for *Hevea* saplings they found and occasionally planting new ones. The case of black rubber, however, was quite different. This rubber was derived from the latex of the *Castilla* genus, which is found both in the Amazon and in the forests of the Pacific coast and Central America. But because this latex dries upon contact with the air, rubber gatherers cut down the

trees to “bleed” them all at once. In short order, therefore, the population of black rubber trees declined dramatically in various regions. Given the sustained rise in prices, peasants and entrepreneurs in Mexico, Central America, and Colombia planted trees that produced this type of rubber. Although the price crash in 1913, caused by the development of rubber plantations in Asia, ended such initiatives, many of their trees survived.

The incorporation of all these regions into the global economy through the extraction of natural resources also had social and political consequences. The arrival of frontier settlers in areas previously inhabited only by indigenous groups altered the latter’s subsistence practices and initiated a new wave of mortal epidemics. In the wake of these *colonos* came the establishment of state institutions, such as municipal authorities, and national ones, and the diffusion of the Spanish and Portuguese languages. The conquest of these spaces generated disputes between countries as they sought to define the location of international borders. These years also saw the growth of cities in the middle of the jungle. While Manaus is the best-known case, there were various others, such as Iquitos, in the Peruvian Amazon, and Tumaco, a maritime port in Colombia. Another intriguing aspect of rainforest settlement during this period, especially in the Pacific region of Colombia and Ecuador and the lower Amazon River Basin, was the creation of “territories of freedom,” in which ex-slaves and their descendants, as well as maroons, remade their lives.

The “discovery” of these frontier regions by coastal and Andean societies strengthened the imaginaries that permitted their symbolic appropriation. The forests, with their exuberant vegetation, have been considered to epitomize the natural realm. Ideas of tropical nature also frequently crystallize around their image. Perceived as awe-inspiring, rainforests were either a source of infinite riches or a land of ruin. Nineteenth-century naturalists, inspired by romanticism and science, saw these spaces as sublime and endowed with uncountable plant and animal species. The extensive trade in some of their resources encouraged this idea of abundance. But such views did not diminish the parallel perception of the jungle as a place where barbarism reigned. In the latter, nature’s overwhelming presence trumped the power of human rationality to impose order and spur on progress. Rainforests have been seen as places of backwardness, disease, violence, and death. Arturo Cova, the protagonist of *The Vortex* (1924), captures this impression—and foretells his own fate traveling into the Amazon during the

rubber boom—in the novel’s opening line: “I gambled my heart with Destiny and it was won by Violence.”

Starting roughly from the mid-twentieth century, the colonization of tropical forests has been associated with large-scale deforestation. For economic, social, and political reasons, rainforest frontiers acquired a novel importance at this time. After the 1964 coup, the Brazilian military made the Amazon Basin strategic to their plans for national development, inaugurating an era of road building and granting subsidies to stimulate settlement. The 1960s and 70s were also the period in which the Alliance for Progress encouraged land reform initiatives in much of the region. Many governments saw these vast territories as a safety valve that could help resolve the acute problem of land concentration without needing to significantly alter the existing agrarian structure. For example, between 1963 and 1980, the Colombian state encouraged peasants



Figure 2:
José María
Polanco and his
daughters,
El Tapir,
La Macarena
(Colombia), 1993.
Photo: Claudia
Leal

to migrate into the jungle as part of the *Caquetá 1* and *Caquetá 2* projects, which had an impact on three million hectares of forest. On these frontiers, nominally the property of the state, many other peasants also found spaces where they could establish themselves on an independent basis. In addition, mining entrepreneurs and cattle

ranchers took advantage of state subsidies and new infrastructure, frequently buying out the “improvements” or farms that the previous wave of colonos had established. In most cases, these diverse processes have ended in the establishment of pastures for extensive ranching. In the case of the Amazon, this deforestation has been concentrated along the outer rim of the basin: on its southeastern front, in Brazil, and on its western flank, bordering the mountains, in the Andean countries.

The ideology of civilization’s triumph over an intractable nature and wild population has been instrumental in the conquest of rainforest frontiers. But dreams of development have only been partially fulfilled in these regions, which are still largely considered frontier territories, or spaces only partially integrated into the nation-state. In Colombia, the presence of guerillas and cocaine cultivation demonstrate the marginal character of its jungles. By contrast, the dramatic deforestation of the Atlantic Forest between 1850 and 1950, which helped in the radical transformation of this tract of coastal territory into the economic heart of Brazil, is an exception to this general tendency.

Environmental and indigenous movements have pushed people to imagine these spaces in new ways. Faced with alarming rates of rainforest destruction, notions of biological diversity, which modifies the old idea of infinite riches, and the inherently wise environmental stewardship of indigenous groups, have gained in strength. In response, protected areas and ethnic territories have altered the map of tropical forests. Since the 1980s, national parks have sprouted up throughout the Amazon Basin. Given the sheer size of the forest, plus the conservation scientists’ insistence on protecting large areas to maintain biodiversity, the total extension of these new parks has far surpassed that of previous national parks. The 1980s were also marked by the multiplication of indigenous reserves, as well as the creation of communal lands for black communities, such as those of Colombia’s Pacific region and the *quilombolas* in Brazil, whose largest territories are found in the Amazonian states of Pará and Maranhão. Since the practices of these ethnic groups are assumed to be environmentally sustainable, the formal recognition of their territorial rights can also be seen as part of a larger conservation strategy. Brazil has also instituted a new form of land tenure, the extractive reserve, associated with peasant communities who depend on the extraction of forest products. All told, these efforts have diminished the rate of deforestation in recent years, at least in the greater Amazon basin, though they have neither stopped the transformation of the forests nor halted the problematic effects of such processes on their original inhabitants.

Selected Sources

- Castro Caycedo, Germán. 2011. *Mi alma se la dejo al diablo*. Bogotá: Editorial Planeta. (First edition, Plaza y Janés, 1982).
- Cleary, David. 2001. "An Environmental History of the Amazon: From Prehistory to the Nineteenth Century" *Latin American Research Review* 36, no. 2: 64–96.
- Schmink, Marianne and Charles H. Wood. 1992. *Contested Frontiers in Amazonia*. Columbia University Press.
- Schwartz, Norman B. 1990. *Forest Society: A Social History of Petén, Guatemala*. Philadelphia: University of Pennsylvania Press.
- Weinstein, Barbara. 1983. *The Amazon Rubber Boom, 1850–1920*. Stanford: Stanford University Press.

Lise Sedrez

Urban Nature in Latin America: Diverse Cities and Shared Narratives¹

Latin America is an urban society. Despite differences in opinion about how national censuses distinguish between “urban” and “rural,” the consensus is that approximately 80 percent of Latin America’s population now live in cities. It is in the cities, therefore, that four out of five Latin Americans must negotiate their access to food, water, air, land, parks, and coexist with urban populations of mosquitoes, rats, pigeons, dogs, and cats, among many others animals. The everyday experience of nature for these Latin Americans are Havana’s urban beaches; rainwater gushing from buildings and into drains in Bogotá; overflowing rivers in Buenos Aires; children’s tree-swings in Lima’s town squares; the smoke-filled air of central Mexico; the erosion of overcrowded hilltop settlements in Rio de Janeiro; or the smell of animals, people, and machines in the colonial streets that have borne witness to the passing of generations up until the twenty-first century. The construction of urban nature, combining trees and buildings, rivers and streets, is as much a part of Latin America’s environmental history as the Andes, the forests, the deserts, and the mines are.

There is no one single historical narrative that can encompass the manifold origins and individual national trajectories of Latin American cities. There are, however, narratives which are common to urban experience on the South American continent. The small villages of the interior areas or the large coastal cities, the capital cities or the border towns: they are all interconnected by these narratives in a network of relationships shaped by political decisions, economic pressures, and environmental demands. This network occasionally goes beyond national or regional boundaries and forces us to understand cities not only in respect of their own urban boundaries, but also in respect of the position they occupy in this network. In this way a narrative can be established that includes both villages that grew up to serve the coffee harvest in the Colombian highlands, and the city-ports of Maracaibo, Barranquilla, and Buenaventura through which much of this coffee was exported. Cities, therefore, extend their networks and entwine not only the history of different countries, but also ecologically distinct regions such as the Andes and the Caribbean.

This shared narrative can be more easily understood if we think of the urban network as an integrated system, in which each city-entity has its own unique dynamic, which nevertheless affects the dynamics of other related city-entities. The various characteristics of these

1 English translation by Rocky Hirst.

city-entities—in terms of size, population, political importance, and location—not only include elements which describe each city, but also those that describe the system as a whole. From capital cities to remote hamlets, the urban experience is explained less by the opposition between the countryside and the city, than by the image of a continuum—an uneven and disordered continuum, certainly, but one that highlights the integration of cities into rural economies, extractivist communities, and into the Latin American landscape in general.

Latin American cities were at the heart of the colonial experience. The arrival of Europeans in the fifteenth century and their project of colonization required the ties with Old World to have strong urban foundations. Alfred Crosby, in likening the great voyages to “reknitting together the seams of Pangaea,” pays little heed to the fact that the stitches that hold these seams together are the cities (Crosby 1993). Ships laden with plants, animals, and germs (intentionally or otherwise) arrived in the colonies via the cities, whilst coveted colonial products such as precious metals, sugar, tobacco, *drogas do sertão* (exotic plants with medicinal properties), and tropical birds exited through the same cities’ ports. Although colonial cities in Latin America were not necessarily the “Neo-Europes” imagined by Crosby, they did connect Latin America to the dynamics of the mercantilist system that changed the Latin American environments so radically.

The location of Latin America cities from the sixteenth century onwards likewise follows mercantile logic, being based on three significant variables. The first is whether communication with the capital city was safe and reliable. A good harbour provided protection from enemy attacks (European or otherwise) and rivers facilitated access to the wealth of the interior. Bays, capes, and estuaries were all highly prized as bases for an initial urban settlement. A second variable is the existence of valuable natural resources in the vicinity. Proximity to gold and silver mines, as well as the availability of timber, favored the creation of urban centres such as Potosí in Bolivia, which, in the seventeenth century, became one of the largest and richest cities in the world, with about two hundred thousand inhabitants. Finally, colonizers placed cities where they could count on the availability and management of labor. Colonial cities established their hierarchies of power and domination over areas which had already been transformed and domesticated, and thus they secured control of the human element required to turn nature into wealth. Mexico City rose on the site of the captured city of Tenochtitlan. To these three determining factors we can add those towns and villages that emerged from the domestic economy in Latin America, i.e., cities that developed on the edge of trade routes, small settlements that were stopping points for cargo haulers, or bases for exploring the

interior areas. This is the framework on which the foundations for Latin America's urban network were established.

However, the elements that guided the creation of the colonial cities gave scant impulse to their expansion. Until the mid-nineteenth century, few Latin American cities had expanded beyond their colonial boundaries—Havana, Cuba, at the height of the sugar production industry in 1830, is one of the few exceptions. Other than Argentina, Brazil, and Mexico, most Latin American countries had one or two main cities which dominated the relationships between that region and the international markets. In fact, the first half of the nineteenth century saw what Richard Morse called “urban decline,” in which cities lost some of their attractiveness, and grew little amid the wars and conflicts of the independence period (Morse 1975). This decline, however, was dramatically reversed in the second half of the nineteenth century. With increased integration of Latin American countries into the global industrial economy, cities grew exponentially. On the one hand, the modernisation of rural farmland and the increasing land concentration necessary to meet these new demands caused great waves of domestic migration from the countryside to cities. On the other hand, cities offered new opportunities for social mobility to newcomers—and not only for Latin Americans. Latin America, especially Brazil and Argentina, became a sought-after destination for immigrants from Europe, Asia, and elsewhere. Up until 1900, only Buenos Aires and Rio de Janeiro had more than half a million inhabitants; during the twentieth century the parameters for the Latin American urban landscape widened dramatically—today, these two megacities have 13.6 and 12 million inhabitants respectively. However, urban growth did not occur only in capitals and major cities. In the same time period, the railroads expanded the reach of cities into areas that had hitherto hardly been explored areas. As a result, the urban network witnessed the emergence of hundreds of towns in these new frontiers.

The history of Latin America's urban system has, in my view, four main interdependent themes, which need to be analyzed both diachronically and synchronically. The first element relates to the metabolism of cities and how it transforms itself over time. By means of their transportation routes and from their place in the productive system, cities absorb resources and energy: they consume, transform, and transfer these, and secrete by-products as a result of such processes. The megacity of São Paulo, Brazil, for example, has grown as the Atlantic Forest has shrunk—transformed into energy for its industries. The way this energy has been produced, however, has not remained the same. Until the mid-twentieth century, firewood and charcoal were the main sources of energy for São Paulo (Brannstrom 2005). The city's industrial growth increased its

energy requirements at a rapid rate, and from the 1950s hydroelectric dams in the region multiplied, turning large forest areas into reservoirs. Similarly, the cities of Buenos Aires and Cordoba in Argentina also owe much of their development to the exploration of the Pampas plains. These cities process the wheat, meat, and more recently soya beans which are produced on a large scale in the countryside. The importance of the city as a space for transformation and consumption cannot be underestimated, both in environmental and cultural terms. It stems not only from the amount of food consumed in the city, but also from the appropriation of traditional products which are then reproduced on a large scale in the cities. Urbanites reinvented the *fogo de chãõ*, the traditional gaucho barbecue, in city steakhouses, with varying degrees of refinement; *tortillas* and *arepas* (tradition flatbreads), commercialized and wrapped in plastic, fill the shelves of supermarkets in Mexico City and Bogotá. In this way, the city's voracity in the twentieth century shapes both urban and non-urban landscapes.

A second element concerns the consequences of the new urban model, which required the morphological adaptation of older cities. Cities that were functional in the sixteenth century, with a few hundred or even a few thousand inhabitants, have very different requirements in the twentieth century—requirements for transportation and housing, for expansion into new land, for the distribution of food, etc. As the population increased, concepts and expectations of hygiene and human mobility also changed. The transformation of the colonial city into the modern city, and later into the industrial city, has had significant environmental impacts. In Colombia, the city of Tumaco is built almost entirely on mangrove swamps; in Rio de Janeiro, hills were flattened and rivers channelled; in the Caribbean, the enthusiastic use of DDT allowed the use of areas that had hitherto been off-limits due to the presence of epidemics. These transformations, which took place at breakneck speed, also revealed the environmental vulnerability of the urban model in Latin America's history. The growth of cities has led to the intense use and settlement of floodplains—and rain that used to fall on meadows and forests is now the cause of disasters which put the urban population at risk (Sedrez & Maia 2011). In 1911, for example, heavy rainfall in the Rio de la Plata basin caused dramatic flooding of riverside towns such as in Avellaneda in the province of Buenos Aires. The settlement of these new urban areas, as well as the modernisation of former capital cities, usually happens unevenly so that the poorest sectors of society are concentrated in areas of high environmental risk—and thus social vulnerability is linked to environmental vulnerability.

A third element is indeed urban inequality and how it affects access to natural resources, such as water, soil, and air, in different sectors of the city. The *urbes* is not homogeneous,



Figure 1:
Firefighters and neighbours rescuing flood victims in Avellaneda, Argentina, 1911. Source: Avellaneda, Municipal Government. Source: <http://www.avellanedawebsite.com.ar/archivo/diapo.php?cat=3&num=40&expand=php?cat=3&num=40&expand=php?cat=3&num=40&expand>

and different groups seek to ensure the availability (both quantity and quality) of these resources for themselves. The development of shanty towns (*barrios*, *favelas*, and *villas*) is an important and crucial part of the environmental history of the city, and also of its political history. Cities that consume and process resources also generate large amounts of waste: domestic sewage, garbage, and atmospheric contaminants. The question is therefore not just of access to water, but access to *clean* drinking water. Likewise, it is not only about having access to housing, but access to housing in areas with waste management and clean air. Cholera and yellow fever epidemics, often perceived as resulting from the risks of a deprived urban environment—such as lack of ventilation, polluted air, or poor sanitation—provided an example of injustice that provoked much popular activism and provided a template for future campaigns for urban equality. Discussions on inequality and access to resources in urban areas must also include debates on health, contamination, pollution, and waste disposal. How can these issues be negotiated? How can they be introduced onto the political agenda? How can they be applied (if at all) in cities as diverse as Santiago and Havana? It is important to understand here the role of the state and public policies in shaping the urban environment in capital city spaces, since the practices developed in these areas usually reverberate on the rest of the urban network. This element, rather broad by definition, ranges from the emergence of green areas as a result of late nineteenth-century urban reforms to the development of environmental agencies that monitor pollution, erosion, and air and water quality in cities.



Figure 2:
New Year's
Eve in Copaca-
bana, 2012.
Source: Lise
Sedrez

Finally, a fourth element refers to urban expansion and how new spaces are disputed by the population. The emphasis here is on the ways in which urban populations have begun to claim what has subsequently been defined as “environmental rights.” In this historical process, the annexing of new territories for the industrial cities, the arrival of immigrants, and, principally, the dispute over water played a significant role. However, it is important to understand how urban nature in Latin American cities has been divided between public and private use especially since the mid-twentieth century. On the one hand, there has been an increase in “green gated communities,” i.e., enclosed areas of housing for the urban elite that suggest a bucolic experience, with woods and clean air—basically a romanticised rural experience within the city. Whether it be in Mexico City or in Belo Horizonte, Brazil, this privatization of urbanized nature is only possible by excluding those communities which traditionally occupied these areas and which now find themselves surrounded by the city’s expansion (Duarte 2012). On the other hand, there is a growing demand by the urban public for green spaces for the purpose of social interaction. The *plazas*, an old Latin American tradition, are celebrated for their old trees and for the green space they offer. Parks which have been

landscaped to be reminiscent of the countryside or remnants of ancient forests, establish a new aesthetic of urban nature, initially in larger cities, but quickly reproduced in smaller cities. They become leisure spaces (for games and family life), meeting areas (for demonstrations or protests), or simply proud celebrations of urban nature. The start of the New Year on Copacabana's famous beach, with fireworks and offerings to the Afro-Brazilian deity Yemanjá, the lady of the waters, has become one of the highlights on Rio de Janeiro's tourist calendar. In 2012, over two million people gathered to meander between sea, sand, and asphalt.

The Latin American city is the result of a combination of various historical processes: the voracious city as a part of a larger system; the adapting city, vulnerable at the same time; the unequal city, burdened by conflict; and the self-aware city that negotiates and celebrates its green spaces. Environmental history allows us to see these multiple cities from new angles, highlighting the complexity of urban nature in Latin America.

Selected Sources

- Brannstrom, Christian. 2005. "Was Brazilian Industrialisation Fuelled by Wood? Evaluating the Wood Hypothesis, 1900–1960." *Environment and History* 11, no. 4: 395–430.
- Crosby, Alfred W. 1986. *Ecological Imperialism: The Biological Expansion of Europe (900–1900)*. Cambridge: Cambridge University Press.
- Duarte, Regina Horta. 2012. "'It Does Not Seem Like We Are Even in Brazil,' Country Clubs and Gated Communities in Belo Horizonte, Brazil, 1951–1964." *Journal of Latin American Studies* 44: 435–66.
- Loreto, Rosalva, ed. 2009. *Agua, poder urbano y metabolismo social*. México: Instituto de Ciencias Sociales de la BUAP.
- Morse, Richard M. 1975. "The Development of Urban Systems in the Americas in the Nineteenth Century." *Journal of Interamerican Studies and World Affairs* 17, no. 1: 4–26.
- Sedrez, Lise and Andrea Casa Nova Maia. 2011. "Narrativas de um Dilúvio Carioca: Memória e Natureza na Grande Enchente de 1966." *Revista História Oral* 14, no. 2: 221–54. Available at [http://revista.historiaoral.org.br/index.php?journal=rho&page=article&op=view&path\[\]=239&path\[\]=271](http://revista.historiaoral.org.br/index.php?journal=rho&page=article&op=view&path[]=239&path[]=271)

John Soluri

***Campeños* and the Hidden History of Biodiversity**

The Food and Agriculture Organization (FAO) of the United Nations has declared 2014 the Year of the Family Farm in recognition of “the important contribution that family farming and smallholder farming can play in providing food security and eradicating poverty . . .” (United Nations). The FAO’s largely symbolic gesture resulted in part from political pressure applied by La Via Campesina, a transnational network that promotes small-scale agriculture. In an era of economic globalization, small farms have emerged as potent symbols of social justice and environmental sustainability. But, the contemporary importance of *campesinos*, or small-scale cultivators, in Latin America is not only symbolic. In Brazil, small farms produced nearly half of the country’s maize, 70 percent of its beans, and nearly 90 percent of its yucca in 2006. In Mexico, more than two million *campesinos* cultivate maize. Moreover, field research consistently demonstrates that small-scale farms are more biologically diverse than large-scale monocultures.

Unfortunately, historians of Latin America and the Caribbean have paid little attention to small-scale agriculture and its contribution to the region’s agrodiversity. By placing *campesinos* at the center of Latin America and the Caribbean’s rural environmental history I intend to examine the hidden history of agrodiversity—both the varietal suite of crops (“planned diversity”) and the uncultivated flora and fauna that reside on or near farmlands (“associated diversity”). In order to do so, I have to bear in mind the legacies of the pre-colonial and colonial eras. Many crops cultivated by modern *campesinos* originated in the Americas. This means that there are centers of domestication, mostly in tropical locations, where one finds local “landraces” (open-pollinated varieties) of crops including maize, beans, squashes, potatoes, tomatoes, peppers, quinoa, manioc, peanuts, and sweet potatoes. In addition, colonizers from Iberia and slaves from Africa introduced many other crop plants including bananas, barley, beets, carrots, coffee, grapes, oil palm, rice, sugar, and wheat. During the colonial era, food became a marker of social identity; colonial elites often disparaged native crops such as maize, chocolate, and peanuts as *comida de indios* (Indian food), even as daily conditions compelled them to partake of native foods. An additional legacy was the demographic collapse of indigenous populations due to colonizers’ violence and the unintentional introduction of pathogens and parasites in the sixteenth and seventeenth centuries. Among other things, the massive population decline

affected nineteenth-century agriculture by creating conditions of land abundance (with land often covered in secondary forests) and labor scarcity.

Here I provide brief examples of three crops of global importance: maize, potatoes, and coffee. The first two crops have been central to foodways in Latin America for millennia; coffee, introduced to the Americas during the colonial era, became the region's most lucrative agro-export in the nineteenth and twentieth centuries. Small-scale cultivators have been central to the production of all three.

Researchers have recorded more than 50 distinct open-pollinated landraces of maize in Mexico, the modern-day territory of which includes centers of early maize domestication and where the botanically related teosinte plant can still be found. Landraces constitute approximately 80 percent of Mexico's total maize crop, 75 percent of which is cultivated by campesinos working rain-fed soils. How have these varieties persisted through the numerous political, social, and green revolutions described in this issue by Boyer and Cariño? Part of the answer lies in nineteenth-century agrarian structures. Economic historians have demonstrated that *haciendas* in postcolonial Central Mexico generally could not compete with campesino maize production on *temporal* (non-irrigated) soils. However, by the late nineteenth century, the combination of rising grain prices and surplus labor enabled estate owners to expand onto temporal lands through the use of sharecroppers, who mobilized the labor of family members to assist with maize cultivation. Moreover, in many rural areas the number of *ranchos* (relatively prosperous family farms) actually rose in the years prior to the revolution. In all likelihood, this multitude of small-scale cultivators, growing maize under variable environmental conditions, augmented agrodiversity. On the other hand, some sharecropping contracts dictated that the haciendas would supply seed, suggesting a centralization of decision-making that may have occasioned a decline in varietal diversity.

The Mexican Revolution (1910–1920), driven in part by campesinos seeking guarantees to land, water, and forest resources, culminated with the formation of a powerful, central state committed both to economic nationalism and ensuring the preservation of rural livelihoods. The revolutionary state implemented land reform, expanded rural education, promoted agricultural cooperatives, and introduced new technologies in the form of fertilizers and hybrid seeds. Between 1940 and 1980, maize harvests increased six-fold due largely to expanded acreage and fertilizers; however, hybrid seeds associated

with the so-called Green Revolution did not have a major impact outside of the states of Sinaloa and Sonora where large-scale, irrigated maize farming developed. In the rain-fed, mountainous regions of the states of Jalisco, Oaxaca, and Chiapas, campesinos continued to cultivate open-pollinated varieties. Foodways appear to have played an important role in the persistence of landraces. For example, Oaxacan cuisine often calls for specific varieties of corn. More generally, although Mexico began to import yellow corn from the United States in the 1970s, campesinos continued to supply white corn varieties preferred for tortilla-making (Fernández et al. 2012).



Figure 1:
Farmer in
Guatemala.
Source: Kim
Milward-Oliver
via flickr

In the central Andes, millions of campesinos cultivate a remarkable variety of crops including thousands of varieties of potatoes, maize, and tubers (e.g., ulluco, mashua, and oca) rarely consumed outside of the Andes, in addition to quinoa, a pseudo-grain that has recently become part of a transnational culinary chic. According to geographer Karl Zimmerer (1996), who carried out fieldwork in Paucartambo, a Quechua-speaking region in Peru, the post-independence period (1826–1880) did not bring any dramatic changes in the crops cultivated by the region’s campesinos. However, government, business, and campesino initiatives brought about significant shifts during the twentieth century. The

construction of transportation infrastructure (highways and railroads) helped to revive commercial agriculture during the first half of the twentieth century. Hacienda owners, like their counterparts in pre-revolutionary Mexico, planted their best lands directly and granted campesinos use rights to marginal lands in return for their labor.

Cultivators began to devote more land to a single, high-yielding landrace potato (*qompis*) that became an important commodity in regional markets. In addition, barley cultivation prospered following the establishment of a beer brewery that paid high prices for a particular kind of malting barley. The expansion of *qompis* potatoes and barley led to a curtailment of quinoa planting in the 1950s. Around the same time, hacienda workers cut back on their cultivation of an early potato, known locally as *chawcha*, on account of conflicting labor demands and limited irrigation water being increasingly dedicated to fields planted with the *qompis* variety. In light of the regional domination of commercially oriented haciendas, campesinos' subsistence fields became key places of crop diversity. Drawing on a Quechua notion of a fit livelihood (*kawsay*), Paucartambo campesinos maintained foodways based on landraces even as they incorporated commercial crops like barley into their fields.

Major changes took place in highland Peru in the late twentieth century. The military government led by General Juan Velasco (1969–1975) responded to peasant unrest during the 1960s by instituting a land reform that did away with haciendas and servile labor relations. The Velasco government also promoted industrialization and urbanization via policies that lowered the prices of staple foods like wheat and potatoes. Many of Paucartambo's campesinos participated in new commercial networks, but some found it difficult to maintain both commercial crops and diverse subsistence plots. By 1990, more than one-third of the region's small-scale farmers had ceased to cultivate landraces of "floury" potatoes. This shift did not necessarily signify a loss of Andean cultural identity; to the contrary, prosperous family farmers acquired local prestige by cultivating and cooking meals based on crops like floury potatoes, quinoa, and maize-based chicha beer.

The evidence from Mexico and highland Peru indicates that significant genetic erosion occurred during the past century, but that it did not result from direct substitutions of landraces for "Green Revolution" hybrids, nor did large-scale monocultures literally push out campesinos. Instead, government policies intended to provide low-cost food for urban-industrial workers, in conjunction with rural out-migration and campesino

participation in regional commercial networks, created pressures on labor time and natural resources that reduced the variety of crops cultivated.

In contrast to maize and potatoes, coffee in Latin America and the Caribbean is strongly associated with liberal modernity. Coffee exports helped to finance expanding states in Brazil, Colombia, and Central America. In some places, including the Paraíba valley of Brazil, nineteenth-century coffee planters relied on slave labor and the short-term fertility of forest soils to establish large farms. When coffee production shifted to São Paulo, large estates (in excess of 100,000 coffee plants) persisted, aided by the paulista government that subsidized contract labor in the form of immigrant families. But, in Colombia and Costa Rica, small farms (less than 20,000 plants) accounted for more than 60 percent of all coffee plants in those two nations during the 1930s. The coffee trade therefore gave rise both to large estates and prosperous campesino families who depended upon (and struggled against) the capital, technology, and markets largely controlled by merchants and processors.

At least two relationships, one ecological and the other social, have functioned to foster biological diversity on Latin American coffee farms over the past century. Firstly, coffee is a perennial, woody plant; its botanical cousins in Africa are found in shaded, forest understories. Historically, small-scale coffee farmers have incorporated various kinds of shade plants (including bananas, plantains, and various tree species) into their fields in order to produce export coffee. Secondly, the people (and animals!) who tended to coffee plants also needed to eat. In Colombia, for example, a “coffee” farm often included sugar cane, plantains, manioc, maize, and animal fodder. Contemporary field research indicates that in El Salvador and Nicaragua, small-scale coffee farms collectively contain more than one hundred species of trees and medicinal plants, in addition to several varieties of maize and beans. This planned diversity creates habitats for associated diversity—coffee “forests” provide homes to birds, insects, mammals, and orchids (Méndez et al. 2010). Historians have paid little attention to the meanings of this associated diversity, but it calls into question the assumption that export-oriented crops are antithetical to biological diversity.

Environmental historians of Latin America and the Caribbean have stressed the destructive aspects of export-oriented monocultures. This undeniably important dimension of the region’s rural history does little to explain the persistence of either campesinos or

agrodiversity. Local landraces of maize and potatoes have endured in spite of an unprecedented demographic collapse, centuries of oppressive colonial rule, the rise of export agribusinesses, a rural-to-urban exodus, and the introduction of hybrid seeds. Moreover, coffee systems—overwhelmingly oriented for export—have included both large-scale monocultures and small-scale polycultures. This preliminary analysis suggests that strategies for self-provisioning or subsistence may be crucial for explaining changes in agrodiversity across time and space. Even in regions where agroexports have dominated national economies, scholars need to pay close attention to foodways.

Of course, the history of agrodiversity in Latin America and the Caribbean is not only a tale of persistence. Environmental historians also need to account for the erosion of diversity, particularly over the past fifty years, when a number of forces compelled campesinos to reduce crop plant diversity or even abandon agriculture altogether. The loss of agrodiversity is clearly linked to the history of campesino articulation within both markets and nation-states, but the precise nature and functioning of these linkages remain to be spelled out before the hidden history of Latin America and the Caribbean's agrodiversity can be more fully revealed.

Selected Sources

- Méndez, V. Ernesto, Christopher M. Bacon, Meryl Olson, Katlyn S. Morris, and Annie Shattuck. "Agrobiodiversity and Shade Coffee Smallholder Livelihoods: A Review and Synthesis of Ten Years of Research in Central America." *The Professional Geographer* 62, 2010. 357–76.
- Turrent Fernández, Antonio, Timothy A. Wise, and Elise Garvey, "Achieving Mexico's Maize Potential." Working Paper No. 12-03, Global Development and Environment Institute, Medford, Massachusetts, 2012.
- Food and Agriculture Organization of the United Nations. "Agricultural Innovation in Family Farming." <http://www.fao.org/nr/research-extension-systems/ais-ff/en/> [accessed 10 July 2013].
- Zimmerer, Karl S. 1996. *Changing Fortunes: Biodiversity and Peasant Livelihood in the Peruvian Andes*. Berkeley: University of California Press.

Shawn Van Ausdal and Robert W. Wilcox

Hoofprints: Ranching and Landscape Transformation

In 1976, geographer James Parsons (1989, 278) warned of an “almost mindless mania for converting forest to pasture.” As the din of chainsaws and the crackle of burning underbrush crescendoed, so too did the condemnations of cattle—and hamburgers—as the primary driver of deforestation throughout tropical Latin America. Yet for all the significance of ranching as a major source of environmental change, this history has been misinterpreted in two ways. First, there is a prevailing notion that the environmental impact of ranching was felt to any serious degree only from the mid-twentieth century. Second, the expansion of cattle into the forests of Latin America has been driven fundamentally by incentives located outside of the cattle economy. Here we qualify these perceptions by showing how the environmental impact of livestock has a much longer (and more varied) history than assumed, and we argue that the expansion of ranching has been tied to the growth of both domestic and export market demand, and the biological advantages of cattle.

The population explosion of Old World domesticates introduced to Latin America in the wake of European conquest is well known. In the early sixteenth century, Alonso de Zuazo claimed that a cattle herd, let loose in the disease- and competitor-free environment of the Antilles, would increase tenfold in the space of three to four years. On the great grasslands of Latin America—the Pampas, the Llanos, and northern Mexico—cattle populations grew quickly, eventually numbering in the millions. What were the environmental consequences of this livestock boom? In one of the classic works of Latin American environmental history, Elinor Melville (1994) claimed that they were disastrous: by the late sixteenth century, the proliferation of sheep in the Mezquital Valley of northern Mexico had caused the resource base to collapse, leading to desertification. Various other scholars, however, contend that Melville exaggerated the environmental impact of sheep, partly by overestimating their numbers and downplaying their seasonal movements. Undoubtedly, European livestock helped to change the species composition of their forage base through selective or even overgrazing. In some cases, this might have even caused its productive capacity to drop. Through fire and the extensive rotations of shifting agriculture, ranchers and farmers also formed new grasslands on forest margins. But the declensionist narratives typical of early

environmental history are probably overstated when it comes to the early impact of livestock on their New World environments. For the most part, livestock ranged extensively on natural grasslands (in the case of pigs, woodlands); and their numbers, however impressive in some places, generally do not seem excessive relative to the local resource base. Most evidence suggests that the environmental impact of cattle and other livestock was limited through the colonial period and into the nineteenth century.

Starting in the mid- to late nineteenth century, however, ranching became one of the driving forces of landscape change. A combination of economic integration into the North Atlantic economy (through the export of commodities such as coffee, bananas, sugar, wheat, forest products, and minerals) and population growth spurred the demand for livestock. Most of this demand originated in the domestic market, but in some cases the export of meat, hides, and wool was a significant factor. Expanding markets for livestock products also went hand-in-hand with the settlement of the frontier, where the raising of cattle, sheep, pigs, horses, and mules often came to dominate economic relations. In this process of territorial expansion—and through the modernization of ranching, however slow and uneven—livestock began to radically reshape Latin American environments.

Between roughly 1850 and 1950, this impact was felt principally in three biomes. While horses and other animals were constant companions in the expansion, environmental impacts were driven primarily by beef cattle. The first biome was the dry tropical forests stretching from central Mexico through Colombia and extending into the Caribbean. As ranchers sought to expand beyond the confines of colonial ranching, some took over lands abandoned by export commodity production, such as sugar and tobacco, and others converted agricultural land to pasture in the wake of mid-nineteenth-century liberal economic reforms. But the most significant environmental shift was to start clearing forests in order to plant pasture, usually African introductions such as *pará* and *guinea* grass (see Figure 1). Not only were these grasses seen as more productive and resilient than most native species, but their rapid and dense growth also facilitated the conquest of lowland forests. How fast and far this conversion process occurred is hard to determine, but scattered evidence across Latin America suggests that it was well under way by the end of the nineteenth century and accelerated over the first half of the twentieth century. Even the plantation sector often



Figure 1:
Guatemalan
cowboy in a field
of guinea grass.
Source: Pan
American Union.
*Bulletin of the Pan
American Union*,
vol. 44 (Jan–June
1917): 450.

reserved large areas of land for pasture. By the 1950s, there were about ten million hectares of planted pasture in Colombia, representing two-thirds of the forage base.

The second region was the Pampas of Argentina, Uruguay, and southern Brazil. Here, territorial consolidation extended the livestock economy geographically, but it was the rapidly expanding export trade that provided the principal dynamic. Hides were the first key export commodity, accompanied by dried beef (*tasajo*), but it was wool that led the way for an ecological transformation of the Pampas. In the province of Buenos Aires, the sheep population jumped from a couple million at the beginning of the nineteenth century to some 40 million by 1865. Uruguay experienced similar increases. Sheep displaced cattle into newly-settled frontier areas and in the process significantly transformed the region's ecology. Cattle resurged in the latter years of the nineteenth century, in response to the development of the refrigerated beef trade and the introduction of European cattle breeds, initiating further changes to the pampa ecosystem. By renting land to immigrant wheat farmers with the requirement that alfalfa be planted at termination of the contract, ranchers devised an inexpensive means of converting natural grasslands to pasture—over eight million hectares by 1920—displacing sheep to the drier and more marginal lands to the west and south.

In the rest of Latin America, ranching tended to remain concentrated on natural grasslands. While sheep were relatively important in the Andes, in the coastal range of Chile, highland Guatemala, and northern Mexico, beef cattle were the most important and pervasive form of livestock. In most regions milk production was limited, though always significant for peasant producers and for an expanding urban consumption. With the exception of the Southern Cone, northern Mexico, and some high-altitude grasslands, most cattle grazed on tropical savannas. Both the long-term presence of cattle and the frequent use of fire contributed to change the composition of these grasslands, not always for the better. While some observers recognized the significance of such transformations in the Brazilian *Cerrado* as early as the mid-nineteenth century, by the second quarter of the twentieth century warnings about falling forage production became increasingly common as hardy grasses, better resistant to fire, had come to dominate savanna landscapes. Although the environmental impact in these grasslands was not as dramatic as the wholesale transformation involved in planting pastures in forested areas or the Pampas, the vivid descriptions of the widespread use of fire to rejuvenate grasses indicated the direction in which open rangeland ranching was headed.

The 1950s mark a qualitative and quantitative shift in the environmental history of ranching in Latin America (Figure 2). At this point, the better-known story about the push of ranchers into tropical humid forests began in earnest. In Central America, and indirectly in the case of Mexico, export-led demand from the United States led to a rapid increase in the area in pasture, often cleared out of lowland forests. Between 1950 and 1970, Central American planted pasture totals doubled, then increased another 50 percent by 1983. In general, however, rising *domestic* consumption was the biggest source of new demand. In the case of Brazil, beginning in the 1960s and 1970s, the government sought to develop the interior and consolidate its territorial control over the Amazon. Government subsidies provided a major incentive to the rapid expansion of pasture in the Amazon basin, even if the long-term financial viability of cattle production was doubtful. Part of this expansion replicated a long-standing pattern of land consolidation, pushing (and later following) peasant colonizers deeper into the forest. By the early twenty-first century deforestation in the Amazon had impacted more than 60 million hectares, over 10 percent of the entire Amazon region. Some sectors were more affected than others, most particularly the southern and eastern Amazon, and the bulk of deforestation was the product of the expansion of cattle ranching. Attitudes to the land changed rapidly as the demands of ever more lucrative global and internal markets extended rancher

and investor perceptions of land as a commodity, resulting in an exponential increase in environmental impact.

On the heels of these developments, a related ecological revolution occurred on the tropical savannas of Latin America: the deliberate introduction of African-origin grasses, particularly *brachiaria* (signal grass). As in the Pampas earlier, ranchers radically transformed the natural grasslands on which they relied. Again, this began first in Brazil in the 1950s and by the early 2000s in that country alone there were over 100 million hectares of pastures, 80 percent of which were *brachiaria*. At the exhortation of government and based on the latest in animal science, virtually all ranchers who could afford to switched to exotic species, leading to a widespread reduction in natural pasture. With time ranchers diversified into other species as well, including “improved” *brachiaria*. This “rationalization” of ranching employing the most up-to-date scientific knowledge was duplicated in other regions like Mexico, Central America, and Colombia, leading to a relentless transformation of pastures and varieties of grasses throughout. All told, and given its spatial extent, ranching has been one of the major drivers of ecological change in Latin America from the mid-nineteenth century. Since the mid-twentieth century, this impact has only intensified.

An additional source of environmental change associated with ranching involves the genetic make-up of cattle themselves. In 1850, the cattle of Latin America were essentially locally adapted Iberian breeds. Today many of those breeds are endangered, having been replaced by European (in temperate areas) or Indian (in tropical low-

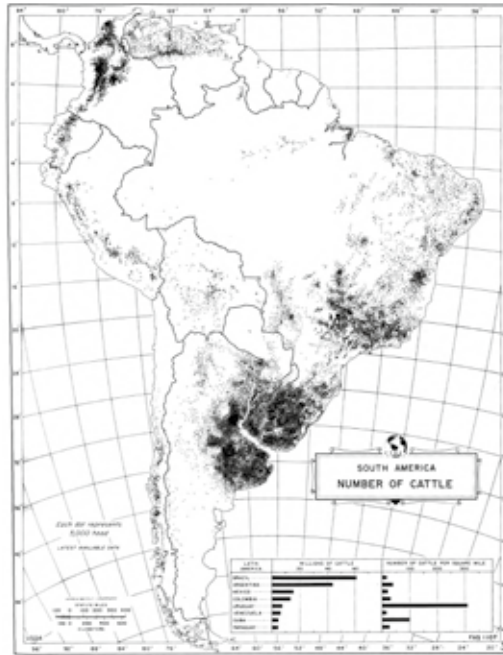


Figure 2: Estimated distribution of cattle in South America in the mid-1950s. Source: U.S. Foreign Agricultural Service, 1958. *Agricultural Geography of Latin America*. Washington, DC: US Foreign Agricultural Service, 67.

lands) cattle. While this transition is significant in and of itself, it has also been critical to the environmental transformation of many regions, particularly since the scientific breeding of animals was supported by arguments for “rational” ranching, opening up opportunities to pasture more head and to expand the business into new lands.

In response to these environmental impacts, there has been an argument, partly colored by the experiences of Amazonia and Central America, that cattle ranching makes no sense economically: pastures cleared out of the humid forests degrade too quickly to recoup initial investment. What drove the expansion of ranching, therefore, was not just the production of beef but government subsidies, land speculation, and territorial control. While such elements have been important at different times and places, we argue that more attention needs to be placed on the *production* of beef and other by-products. Economic demand plays an important part in the story, and for some regions (at particular times), this demand was driven by international markets. But contrary to repeated emphasis in the economic historiography of Latin America on the export trade, much growth in demand came from expanding domestic markets. Such demand itself was driven by the export sector, but it was also tied to growing populations who sought meat as an essential part of their diet. This “food revolution,” which has been investigated globally in recent years, had a significant impact on the raising of cattle in Latin America during the period in question. While it is not within our scope to address this issue in detail here, it is important to recognize that increased demand for beef worldwide contributed to the conditions for further expansion of pastures and bovine populations across the Americas.

Markets alone, however, did not drive ranching in Latin America. To understand its expansion, we also need to pay attention to the environmental advantages of cattle and grass that provided a huge incentive to engage in ranching rather than farming. Vast extents of natural grasslands and (usually) abundant sources of water played important roles in attracting cattle and ranching in the first place, while walking to market (before the spread of rail and roads), the existence of an organic machine to harvest the grass crop, the perennial nature of pastures, and lowered levels of investment risk through relatively rapid liquidity of one’s investment, etc. assured ranchers a reasonable income with comparatively little capital investment. At the same time livestock, especially cattle, have always played a significant role in the lives of smallholders and *vaqueros*, especially as draft animals and providers of milk and meat, besides serving as reserve capital.

Ultimately, an environmental history of ranching is not simply about ecological impacts, but also must address the attraction of specific ecosystems to ranching in the first place, as well as the perceptions of ranchers, cowboys, and peasants regarding their environments. In this manner we come to understand more deeply how the underlying material and ecological basis of the beef cattle industry explains its spectacular historical trajectory.

Selected Sources

Edelman, Marc. 1992. *The Logic of the Latifundio: The Large Estates of Northwestern Costa Rica Since the Late Nineteenth Century*. Stanford, Calif: Stanford University Press.

Kaimowitz, David. 1996. *Livestock and Deforestation. Central America in the 1980s and 1990s: A Policy Perspective*. Jakarta: Center for International Forestry Research.

Melville, Elinor K. 1994. *A Plague of Sheep: Environmental Consequences of the Conquest of Mexico*. Cambridge: Cambridge University Press.

Parsons, James J. 1989. "Forest to Pasture: Development or Destruction?" In *Hispanic Lands and Peoples: Selected Writings of James J. Parsons*, edited by William Denevan. Boulder: Westview Press, 275–95.

Sábato, Hilda. 1990. *Agrarian Capitalism and the World Market: Buenos Aires in the Pastoral Age, 1840–1890*. Albuquerque: University of New Mexico Press.

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Extracting Histories: Mining, Workers, and Environment

“Can we live without mining?” asks a colleague reviewing this text on the last two centuries of mineral extraction in Latin America. Mining and oil companies, foreign and domestic, are convinced we cannot and have ushered a new rush in petroleum, minerals, and metals—the building blocks of modern society. The “boom” is the latest reincarnation of a colonial era business that intensified with industrialization in the nineteenth century. The continuities in the practice are as striking as the breaks are remarkable. The technologies of extraction have changed dramatically. Yet in keeping with historical trends, the industry has provoked intense social conflict due to its impact on nature, workers’ bodies, and local communities—the elements that prompted my colleague’s question. Let us examine, then, the history of mining and oil in contemporary Latin America to understand his concern and answer his query.

Gold and silver, what sixteenth-century Europeans considered “specie,” are the precursors of contemporary Latin American mining. For three hundred years, mining fueled colonialism, nourishing Europe’s rise to global prominence and Chinese imperial coffers. Testament to the richness of Latin America’s subsoil is the extravagant display of silver and gold in European and Latin American colonial churches that astonish the most jaded tourist. Invisible but ensconced in that architecture and precious art are the millions of indigenous and African workers whose bodies and health were undermined to retrieve such treasure. Mercury poisoning, respiratory insufficiency, and maiming accidents were their fate throughout the empire. Forgotten also are the scarred landscapes left in erstwhile famous colonial mining sites such as Zacatecas and San Luis Potosí (Mexico), Potosí (Bolivia), or Huancavelica (Peru). Today both labor and nature are obscured in the cool shadows and bright artifacts of imposing European cathedrals. The same is not altogether true of the nineteenth century.

The Colony ended by the 1820s for the mainland but mining recovered haltingly due to political and economic instability. The impetus for renewed mining was the nascent industrialization of Europe. Minerals, metals, and previously ignored natural products suddenly acquired value and created high demand. Latin American nature and labor provided. Peruvian guano, piled in small mountains by millions of birds over millennia,

for instance, nourished English agriculture beginning in the 1840s until the organic matter was close to depletion by the 1870s. Likewise and for the same reason, Chilean and Bolivian magnates hired thousands of workers to mine for nitrates in the desert ecologies shared by Bolivia, Peru, and Chile. Work in the deserts was physically demanding, harsh, and exhausting. Fed by South American fertilizers and the bodily exertion of its workers, the industrialization of Western agriculture proceeded apace and spurred Latin American elites into a resource war. The War of the Pacific (1879–1883) was fought by Chile, Peru, and Bolivia. Chile won, increasing its territory by a third, leaving Bolivia landlocked. Nitrate mining, however, ended in the early twentieth century as nature's bounty lost value to synthetic fertilizers.

Keeping pace with the acceleration of European and US industrialization, mining expanded in more countries in the late nineteenth century. Latin American elites convinced that the export economy paved the way for progress liberalized laws to welcome foreign investment, opening up their ecosystems to exploitation and procuring the labor necessary to respond to demand from abroad. Bolivian tin became a prized commodity for canned foods and other uses. Local capital invested in new mines, attracting thousands of men to the desert in the process. Silicosis suffocated them and cave-ins entombed them. Survivors became highly politicized union men, the backbone of revolution by 1952. In Mexico, meanwhile, innovative technology coupled with 1890s Liberal economic policies and legislation that courted foreign investment industrialized mining itself and allowed US companies to return to colonial mining sites and dig deeper. In the process a new toxin, cyanide, was thrown into the mix and released into the environment. The health risks for miners and local communities increased as a result.

In the early twentieth century, European and US industrial needs promoted and developed a new extractive industry: petroleum. Coveted as fuel for machines from railroads to trucks to war tanks and planes, oil became of strategic importance by World War I. Mexico and Venezuela were first to experience substantial drilling. Therefore, they were first to witness oil spills, fires, and hydrocarbon pollution. The worst spill and fire in history, in fact, occurred at San Diego de la Mar, Veracruz in 1908. The exploded well, "Dos Bocas," shown in the photo below, became a lake that contaminates the landscape to this day. Ensuing socioecological conflict spurred Mexican oil workers to agitate successfully for nationalization in 1938.

The idea of nationalization soon spread. Chile, Cuba, Bolivia, and Venezuela joined Mexico in nationalizing their extractive industries over the course of the twentieth century. Argentina and Brazil, similarly, established state companies to gain control over the subsoil, which governments saw as a “natural resource” with potential for commercial exploitation. Generally labor tended to gain political voice under national ownership of nature’s underground deposits of minerals, metals, or oil. In the best case scenario, such as Mexico, nationalization of oil meant the government possessed an independent source of income that was used for economic development (infrastructure, schools), yet the damaging environmental effects of extraction went unmitigated. Despite environmental protection legislation, *Petróleos Mexicanos* (PEMEX) inflicted pollution, deforestation, soil degradation, and wild life destruction upon every community in which it operated.



Figure 1: “Dos Bocas” well exploded and caught fire on 4 July 1908. It burned for 57 days. Photograph by Russell Hastings Millward for *The National Geographic Magazine* 19:11 (November 1908).

Government recognition that oil represented a major commodity in the twentieth century led to another Latin America resource war. This one involved Bolivia and Paraguay. With Standard Oil prospecting in the arid ecosystem of the Gran Chaco, both governments sought control over disputed boundaries in anticipation of petroleum riches. Some 100,000 men lost their lives during the three-year conflict (1932–1935). A great number of Bolivians perished from thirst rather than combat, given the Chaco’s dryness and isolation from supply lines. Paraguay won the war and Bolivia, once again, lost territory to a neighbor.

At mid-century, extraction grew. Chile’s nitrate cycle was replaced by copper, mined since the dawn of the century. Geography and ecology, however, posed challenges for successful copper mining: high altitudes, aridity, labor scarcity. Foreign copper companies overcame nature’s obstacles through technological innovation, including

open pit mining via huge machines that could excavate the earth and crush its ore in ever more massive quantities without requiring additional labor. The scarring of the landscape intensified as did the policing of labor, which was confined to company towns in isolated locales. Dangerous and exploitative conditions contributed to working class radicalization and, as in Bolivia and Mexico, to revolutionary roles. Chilean miners were key actors in the election of socialist candidate Salvador Allende to the presidency in 1970. Their militancy, too, contributed to the final nationalization of the copper mines during his short three-year tenure in power.

Small countries became involved in mining at mid-century and experienced deleterious environmental consequences. Nicaragua, for example, produced enough gold by the 1950s, to be among the largest fifteen producers in the world. Located in tropical rainforests, mining fostered deforestation and heavy metal contamination of soils and water. Jamaica, similarly, joined the extraction world in the 1950s. Aluminum had become a valued industrial metal by then and the tiny island had one of its main mineral components, bauxite. Excavated in open pits, bauxite is blamed for deforestation in central Jamaica, in addition to social conflict due to the forced resettlement of communities living in areas identified as mineral rich.

At century's end, extraction intensified and expanded notably across Latin America. Modern society's dependency on petroleum, added to the rise of the high tech electronics industry and the growth of global consumer capitalism, including in Latin America, drove the demand for extraction exponentially. Ecuador, for instance, yielded oil and endured intense socioecological conflict as a result. Petroleum mining in the Ecuadorean Amazon subjected indigenous peoples and the environment to the worst consequences of oil development: deforestation, pollution, and illness. Small mining activity also grew steadily to satisfy demand for metals like gold. Colombia's small-scale gold miners and Brazil's *garimpeiros* led gold production in both countries. Unable to control the dispersal of mercury in the environment, this group of miners exposed their bodies and communities to poisoning without proper recourse to prevention or treatment.

Large scale open pit mining appeared on the landscape as well. An innovative response to reduced quantities of desirable minerals and metals within easy reach, open pit mining requires much less labor than previous technologies as it disturbs greater geographical spaces. As the photograph of Cananea, Mexico, shows, the open pit



Figure 2:
Open pit copper mine at Cananea, Sonora, Mexico, 2011. Photograph by Garrett D. Brown.

process often entails the wholesale razing of mountains and their ecosystems. The discarded ore, literally tons of rocks and tailings, gives rise to an allied process, that of “waste” disposal. Carcinogens and environmental pollutants permeate the slag, more often than not abandoned without remediation. One of the biggest open pit mines in the continent is Brazil’s Carajás complex, the largest iron mine in the world, covering nearly one million square kilometers of Amazonia. Inaugurated in 1985, the project has disrupted local the local ecosystem and, by some accounts, altered the climate already. Smaller Brazilian open pit mines such as the bauxite mine alongside the Trombetas River and the aluminum mines in Pará that require damming of the Tucuruí River for energy also threaten Amazonian ecosystems.

Nevertheless, extraction has been creative. It created the modern world, with its rapid transportation systems, its computers and cell phones, and its countless durable and replaceable consumer goods. For those whose class position denies them access to the modernity that is the fruit of mineral mining—often including workers in the industry themselves—there is at least the joy of electricity and television sets that al-

low remote villages to cheer their favorite soccer teams. Hence my colleague's query about our dependence on mining: it is possible to live a modern life without extraction? The answer is definitively no.

But extraction creates in other ways too. It has generated social critical consciousness and environmental thought and activism in Latin America and beyond. Bolivia, one of the poorest countries with one of the longest histories of mining, has treaded carefully around its lithium deposits, considered among the largest in the world, despite the metal's skyrocketing value for battery manufacturing. Bolivia's historical mining legacy has inspired new discourses about the meaning of modernity and life in relationship to nature, including the idea that *el buen vivir* (the good life) need not entail endless consumption. Ecuador tried to challenge the international community to pay for keeping its petroleum underground as a global environment-friendly gesture, given the connection between burning fossil fuels and climate change. When no one picked up the gauntlet, President Rafael Correa announced that oil extraction would commence again, unleashing a local polemic that has not been resolved. The lawsuit Ecuadorian indigenous people filed against ChevronTexaco in US court in 1993 demonstrates the creativity which communities use to defend their environments and health. The plaintiffs won their multi-million dollar suit in Ecuador, a major accomplishment. A decade later, the case is still under appeal with ChevronTexaco countersuing the plaintiffs' legal team and supporters in the United States. The precedent of losing a case on the grounds of ecological damage is unthinkable for extractive industries in general, not just ChevronTexaco, so the legal battle continues. In the meantime, Bolivia, at least has furthered the discourse with a campaign for "*Amazonia sin petróleo*." The term "extractivism" has become common to refer to a mentality of depredation, well beyond oil and mining, too. Allies in the Global North, meanwhile, seek pathways to "responsible mining" that respect and include local voices and concerns in the process. Discursively, at least, views of extraction have come a long way from the nineteenth century elites' belief that mining meant progress and development.

Whether *las venas abiertas de América Latina* will heal or even close, however, remains very much a contested question.

Selected Sources:

Alimonda, Héctor, ed. 2011. *La Naturaleza Colonizada: Ecología política y minería en América Latina*. Buenos Aires: CLACSO.

Brown, Kendall W. 2012. *A History of Mining in Latin America: from the Colonial Era to the Present*. Albuquerque: University of New Mexico Press.

Nash, June. 1979. *We Eat the Mines and the Mines Eat Us: Dependency and Exploitation in Bolivian Tin Mines*. New York: Columbia University Press.

North, Liisa, Timothy David Clark, and Viviana Patroni, eds. 2006. *Community Rights and Corporate Responsibility: Canadian Mining and Oil Companies in Latin America*. Toronto: Between the Lines.

Stuart McCook

Prodigality and Sustainability: The Natural Sciences and the Environment

The natural sciences are but one of many different ways of understanding nature. Over time, the peoples who lived in Latin America's diverse landscapes developed complex and varied ways of understanding the world around them. The indigenous groups of the Americas had evolved hundreds of local environmental knowledge systems. The European conquest added new kinds and new layers of local environmental knowledge, from the Afro-Latin American farmers who grew rice in lowlands, to mestizo cattle ranchers, to white creole plantation owners producing crops for export. While the natural sciences had been introduced to the Americas during the conquest, it was during the nineteenth century that Latin America's political and intellectual elites began to systematically enlist the natural sciences to survey the natural world and (ideally) use nature to promote national development. For much of the nineteenth and twentieth centuries, the main goal of the sciences was to keep Latin America's "prodigal" landscapes as productive as possible. Since the mid-twentieth century, a new countercurrent has emerged, which focuses on using science to conserve biological diversity, and to promote sustainability.

During the long nineteenth century (roughly from the Haitian Revolution to World War I), Latin America's colonial and national governments used the natural sciences to promote the prevailing liberal policy of export-led development. The early nineteenth-century wars of independence marked the almost complete decolonization of Spanish and Portuguese America; only Cuba and Puerto Rico remained in Spanish hands. Most nations (and even the remaining colonies) pursued economic development through commodity exports, producing tropical goods for industrializing markets in the Global North, which had seemingly insatiable appetites for Latin American products. Latin America's elites shared in the myth of "prodigal" nature, which understood the region's natural resources as being, for all practical purposes, infinitely abundant and inexhaustible. These resources were to be used to promote national economic development: "Sin azúcar," went the Cuban saying, "no hay país" ("without sugar, there is no nation"). By the end of the nineteenth century, Brazil produced four times as much coffee as the rest of the world combined, and Cuba was the world's largest producer of

sugar. This ideology of prodigality was, perhaps, understandable when looking at the vast landscapes of Brazil. But even the elites in comparatively small places like Cuba shared the same vision.

Early in the nineteenth century, states hired naturalists to produce maps of the new nations, and to conduct inventories of their flora, fauna, and other natural resources. These natural history inventories were meant to be practical; states wanted inventories of existing and potential export commodities, and other useful natural resources. Between about 1880 and 1930, almost every nation in Latin America produced a national flora—an inventory of the nation’s plants. These floras were intended to be comprehensive; so naturalists explored their national territories, making arduous journeys to collect plants and to map territories. They also attempted to synthesize all of the botanical knowledge about the nation’s nature held in museums and botanical gardens abroad. These naturalists also selectively (and often silently) appropriated and incorporated local environmental knowledge from indigenous groups, farmers, and others. These inventories generated some unexpected insights about Latin America’s environments. Some landscapes in tropical Latin America were home to a diversity of species that far surpassed expectations. While the word “biodiversity” was not coined until later in the twentieth century, the concept had its roots in this period.

By the late nineteenth century, states also enlisted the natural sciences to address emergent environmental problems, many of which had been caused by intensive commodity production. It became apparent that many of Latin America’s landscapes were not as abundant as earlier observers had thought. The spectacular expansion in agricultural production had produced a host of new environmental problems. Massive deforestation had robbed soils of their nutrients. And many of the region’s leading crops suffered from an unprecedented wave of diseases and pests, a consequence of intensified production, and also of the accelerated circulation of organisms across the Global South. These problems required specialized expertise, opening up a new space for the agricultural sciences. Agricultural science had emerged as a research discipline in early-nineteenth century Germany, and agricultural experiment stations had quickly spread across Europe and North America. Agricultural sciences came to include a wide range of scientific disciplines, including agricultural chemistry, economic entomology, plant pathology, and plant acclimatization and breeding. The coffee planters of São Paulo in Brazil organized a state experiment station in the late 1880s to focus

on the problems of coffee production (Dean 1989). Other agricultural experiment stations soon emerged across Latin America.

For the seven decades between World War I and the end of the Cold War, Latin American states—across the political spectrum—enlisted scientists in projects of state-led modernization. They hoped that prodigal science could do what prodigal nature could not. Agricultural experiment stations in Latin America assumed a newly important role beginning in the 1920s and 1930s. In 1938, the Colombian Federation of Coffee Growers organized a Coffee Research Station (Cenicafé) to study all facets of coffee production. Agricultural scientists tried to help Latin America's farms deal with an increasingly varied and virulent range of diseases and pests. Experiment stations in Cuba and Puerto Rico, for example, introduced new sugar hybrids from Java to mitigate the impact of the sugarcane mosaic virus. North American scientists working for the United Fruit Company worked to combat the Panama Disease, which threatened banana production in Central America.

Beginning in the 1950s, Latin American scientists (along with agricultural scientists across the globe) promoted the “technification” of agriculture, to dramatically increase agricultural productivity. Significantly, these efforts at improving productivity focused on food crops as well as cash crops. These new “Green Revolution” technologies included packages of hybrid seeds, and chemical fertilizers, fungicides, and pesticides. Producers of traditional export crops also technified their farms, often under the guidance of scientists and extension agents from national experiment stations and government agencies, such as Brazil's EMBRAPA (Brazilian Agricultural Research Corporation), founded in 1973. For example, coffee farmers eliminated shade trees, and replaced their old

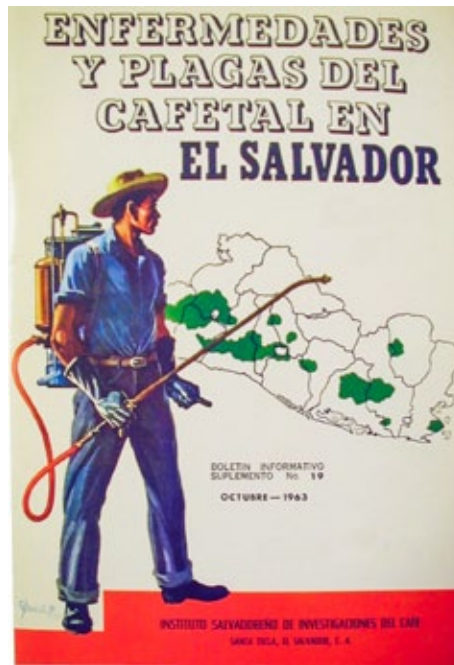


Figure 1: A Salvadoran coffee-sprayer, from an agricultural journal from El Salvador, giving a heroic depiction of the new agricultural technologies being introduced to Latin America after World War II. Source: Abrego, L, J.A. Castello, and L.F. Trigueros. 1963. *Enfermedades y plagas del cafetal en El Salvador*. Boletín Informativo Suplemento no. 19. Santa Tecla, El Salvador: Instituto Salvadoreño de Investigaciones del Café.

varieties of coffee with new hybrid “sun” coffees (many of which had been developed in Brazil). It appeared, then, that prodigal science could replace prodigal nature. Over the short term, technification did produce tremendous spikes in productivity. But these increases often had tremendous economic and ecological costs.

While the agricultural sciences focused on technification, the more traditional natural history—associated with inventories and taxonomies—expanded to encompass newer experimental approaches to field biology, which ultimately evolved into the science of ecology. These new ecological sciences sought to understand patterns and processes in the natural world, the distribution of species, and interactions between species and their environments. Small communities of naturalists continued to conduct inventories and ecological research, and also to lobby publicly for the importance of natural history research. From the mid-1920s to the mid-1940s, for example, biologists at Brazil’s Museu Nacional made concerted efforts to highlight the importance of biology to the Brazilian public and the state (Duarte 2010).

Conservation and preservation of nature—particularly forests—became key themes in the ecological sciences during this period. Foresters expressed growing alarm at the deforestation and destruction of wild environments. They were leading voices in encouraging states to create national parks and nature preserves. Under the administration of Lázaro Cárdenas (1934–1940), for example, the Mexican government created 40 national parks to foster the rational management of nature, and also the promotion of social justice. Other national parks were created across Latin America in the following decades, especially in the 1960s and 1970s, although many were little more than “paper parks” that existed in name only. Scientists and states alike usually conceived of conservation in utilitarian terms. Their primary concern was about the long-term use of natural resources for the benefit of people. If nature was no longer prodigal, it could at least be kept productive through careful stewardship managed by scientists. Beginning in the 1960s, ecology (as a discipline) gained renewed global importance because of the emergence of local and global environmental movements. In the Global North, Rachel Carson’s *Silent Spring* (1962) mobilized an environmental movement concerned about the impacts of agricultural modernization—particularly the impact of agricultural chemicals on people, animals, and landscapes. In the following decades, the ties between ecologists and environmental movements grew stronger and expanded to include concerns such as industrial pollution and deforestation.

The end of the Cold War and the advent of the debt crisis and structural reforms (beginning in the late 1980s and continuing into the 1990s) marked the end of the short twentieth century and the beginning of a new period in Latin American history. Most Latin American countries gradually made the transition to democracy. At the same time, structural reforms imposed by international lending agencies forced many indebted Latin American states to slash public spending. Scientific research institutions had their budgets cut or were closed altogether. All of this took place just at a moment when global attention was focused on Latin American environments. In 1992, Rio de Janeiro hosted the United Nations Conference on Environment and Development, which included representatives from 170 states, and several thousand NGOs. This convention marked a major shift in emphasis: beginning in the 1990s, the theme of sustainability became a central focus for research in the environmental sciences, both pure and applied. Another shift, related to this, is that the environment itself became an object of concern and debate. In previous generations, people addressed environmental issues as a way of addressing political and economic issues, rather than as problems on their own terms.

Biological diversity became a key focus of international environmental movements in the 1980s and 1990s. Conservation scientists, who had been in the backwaters of the environmental sciences a few decades before, became central to the discipline. The global debate over biodiversity (and deforestation) centered around the destruction of the Amazonian Rain Forest, which had been opened up and colonized as part of modernization plans by the Brazilian dictatorship of the 1960s, 70s, and 80s. The discourse of sustainability also made its way into the agricultural sciences. Sustainability in agriculture became just as important as productivity, which had dominated agricultural research for most of the previous two centuries. In some niche industries, particularly in high-value luxury commodities directed at “ethical” consumers, such as coffee, agricultural scientists helped develop organic farming practices. In the 1990s, Cuba’s agricultural scientists helped the country adopt large-scale organic agriculture in the face of catastrophic shortages of petroleum and chemicals. While organic agriculture has gained popularity under certain conditions, conventional agriculture is still widespread.

The paradigm of sustainability has not supplanted the productivist and utilitarian paradigms of the nineteenth and twentieth centuries. Some countries, like Brazil, Costa

Rica, and Bolivia have made considerable headway in protecting their biological diversity, through legislation and the creation of viable parks and biosphere preserves. But these protections are under constant threat. And while agricultural researchers pay ever more attention to sustainability, many of the practices of high modernist agriculture persist. The rapid and vast expansion of soybean agriculture across southern South America involves many of the hallmarks of modernist agriculture, including the use of genetically modified organisms, agricultural chemicals, and large-scale landscape change. This modern “Republic of Soy” encompasses parts of Southern Brazil, Bolivia, Paraguay, Uruguay, and Argentina. Although the discourse of sustainability now pervades the environmental sciences, a considerable amount of research in Latin America still focuses on productivity and prodigality.

Selected Sources

Dean, Warren. 1989. “The Green Wave of Coffee: Beginnings of Tropical Agricultural Research in Brazil (1885–1900).” *The Hispanic American Historical Review* 69 (no. 1): 91–115.

Duarte, Regina Horta. 2010. *A biologia militante: O Museu Nacional, especialização científica, divulgação do conhecimento e práticas políticas no Brasil, 1926–1945*. Belo Horizonte: Editora UFMG.

Evenson, R. E., and D. Gollin. 2003. “Assessing the Impact of the Green Revolution, 1960 to 2000.” *Science* 300 (5620): 758–62. doi:10.1126/science.1078710.

McCook, Stuart. 2002. *States of Nature: Science, Agriculture, and Environment in the Spanish Caribbean, 1760–1940*. 1st ed. Austin: University of Texas Press.

Wakild, Emily. 2011. *Revolutionary Parks: Conservation, Social Justice, and Mexico’s National Parks, 1910–1940*. Tucson: University of Arizona Press.

Suggested Bibliography

Historiographical

- Carey, Mark. "Latin American Environmental History: Current Trends, Interdisciplinary Insights, and Future Directions." *Environmental History* 14, no. 2 (2009) 221–52.
- Castro, Guillermo and Reinaldo Funes. "La Historia Ambiental (hecha) en América Latina y el Caribe: Una actualización." In *Naturaleza en declive: miradas a la historia ambiental de América Latina y el Caribe*, coordinated by Reinaldo Funes Monzote, 29–62. Universidad Nacional de Educación a Distancia, UNED, Centro Francisco Tomás y Valiente, 2008.

General

- Brannstrom, Christian. *Territories, Commodities and Knowledges: Latin American Environmental Histories in the Nineteenth and Twentieth Centuries*. London: Institute for the Study of the Americas, 2004.
- Castro, Guillermo. *Los trabajos de ajuste y combate: Naturaleza y sociedad en la historia de América Latina*. La Habana: Ediciones Casa de las Américas/Colcultura, 1994.
- Chonchol, Jacques. *Sistemas Agrarios en América Latina: De la Etapa Prehispánica a la Modernización Conservadora*. Santiago: Fondo de Cultura Económica, 1996.
- Cook, Noble. *Born to Die: Disease and New World Conquest (1492–1650)*. Cambridge: Cambridge University Press, 1998.
- Crosby, Alfred. *The Columbian Exchange: Biological and Cultural Consequences of 1492*. Westport: Greenwood Pub. Co, 1972.
- Cunill Grau, Pedro. *Las transformaciones del espacio geohistórico latinoamericanos, 1930–1990*. México: Fondo de Cultura Económica, 1995.
- Denevan, William. "The Pristine Myth: The Landscape of the Americas in 1492." *Annals of the Association of American Geographers* 82, 1992: 369–85.
- García Martínez, Bernardo y Alba González Jácome, eds. *Estudios sobre historia y ambiente en América I*. México: El Colegio de México, Instituto Panamericano de Historia y Geografía, 1999.
- García, Virginia. *Historia y Desastres en América Latina Volumen I–II*. Lima: CIESAS, 1996.

Martinez-Alier, Joan. *The Environmentalism of the Poor: A Study of Ecological Conflicts and Valuation*. Cheltenham: Edward Elgar Pub, 2002.

Miller, Shawn. *An Environmental History of Latin America*. Cambridge: Cambridge University Press, 2007.

Palacio, Germán and Astrid Ulloa. *Repensando la naturaleza: Encuentros y desencuentros en torno a los ambiental*. Bogotá: Universidad Nacional de Colombia, Colciencias, 2002.

Stepan, Nancy. *Picturing Tropical Nature*. Reaktion Books, 2006.

Tucker, Richard. *Insatiable Appetite: The United States and the Ecological Degradation of the Tropical World*. Berkeley: University of California Press, 2000.

By Region

Boyer, Christopher, ed. *A Land Between Waters: Environmental Histories of Modern Mexico*. University of Arizona Press, 2012.

Carey, Mark. *In the Shadow of Melting Glaciers: Climate Change and Andean Society*. Oxford University Press, 2010.

Cueto, Marcos. *The Return of Epidemics: Health and Society in Peru during the Twentieth Century*. Ashgate Pub, 2001.

Cushman, Greg. *Guano and the Opening of the Pacific World: A Global Ecological History*. New York: Cambridge University Press, 2013.

Dean, Warren. *With Broadax and Firebrand: The Destruction of the Brazilian Atlantic Forest*. Los Angeles: University of California Press, 1995.

Drummond, Jose Augusto and Jose Luiz Andrade. *Proteção à natureza e identidade nacional no Brasil, anos 1920–1940*. Rio de Janeiro: Fiocruz, 2009.

Evans, Sterling. *The Green Republic: A Conservation History of Costa Rica*. Austin: University of Texas Press, 1999.

Funes, Reinaldo. *From Rainforest to Cane Field in Cuba: An Environmental History since 1492*. University of North Carolina Press, 2008.

- Gallini, Stefania. *Una historia ambiental del café en Guatemala: La Costa Cuca entre 1830 y 1902*. Ciudad de Guatemala: Asociación para el Avance de las Ciencias Sociales en Guatemala, 2009.
- Horta, Regina. *A biologia militante: O Museu Nacional, especialização científica, divulgação do conhecimento e práticas políticas no Brasil 1926–1945*. Belo Horizonte: Editora UFMG, 2010.
- Loreto, Rosalva. *Una vista de ojos a una ciudad novohispana: Puebla de los Ángeles en el siglo XVIII*. Puebla de Zaragoza: CONACYT, 2008.
- McCook, Stuart. *States of Nature: Science, Agriculture, and Environment in the Spanish Caribbean, 1760–1940*. Austin: University of Texas Press, 2002.
- McNeill, JR. *Mosquito Empires: Ecology and War in the Greater Caribbean, 1620–1914*. New York: Cambridge University Press, 2010.
- Melville, Elinor. *A Plague of Sheep: Environmental Consequences of the Conquest of Mexico*. New York, Cambridge: Cambridge University Press, 1994.
- Murra, John. *El mundo andino: población, medio ambiente y economía*. Lima: Pontificia Universidad Católica del Perú, Instituto de Estudios Peruanos, 2002.
- Pádua, José. *Um sopro de destruição: Pensamento político e crítica ambiental no Brasil escravista, 1786–1888*. Rio de Janeiro: Zahar, 2002.
- Pérez, Louis. *Winds of Change: Hurricanes and the Transformation of Nineteenth-Century Cuba*. Chapel Hill: The University of North Carolina Press, 2001.
- Santiago, Myrna. *The Ecology of Oil: Environment, Labor, and the Mexican Revolution, 1900–1938*. Cambridge University Press, 2006.
- Soluri, John. *Banana Cultures. Agriculture, Consumption & Environmental Change in Honduras & United States*. Austin: University of Texas Press, 2005.
- Tortolero Villaseñor, Alejandro. *Notarios y agricultores. Crecimiento y atraso en el campo mexicano, 1780–1920: Propiedad, crédito, irrigación y conflictos sociales en el agro mexicano*. México: Universidad Autónoma Metropolitana, Iztapalapa/Siglo Veintiuno Editores, 2008.
- Wakild, Emily. *Revolutionary Parks: Conservation, Social Justice, and Mexico's National Parks, 1910–1940*. Tucson: University of Arizona Press, 2011.
- Watts, David. *The West Indies: Patterns: Development, Culture and Environment Change since 1492*. Cambridge University Press, 1987.

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Design by Stefan Zinsbacher

Cover photo: Litografía de Eduardo Laplante incluida en Justo Germán Cantero, *Los Ingenios. Colección de vistas de los principales ingenios de azúcar de la Isla de Cuba*, Imprenta de Luis Marquier, La Habana, 1857.

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ISSN 2190-5088

Munich, 2013

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ISSN 2190-5088