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↳ RECIPROCAL LANDSCAPES: STORIES OF MATERIAL MOVEMENTS

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Essay[2]
RECIPROCAL LANDSCAPES: STORIES OF MATERIAL MOVEMENTS

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Formerly a task based on selecting locally available goods, material specification is now a global engagement. Manufacturers of construction materials, from lumber to metals to concrete, are among the world's largest corporations and offer an unlimited banquet of options, detached from locality. Everything is attainable for a price. Access to endless material options is tantalizing, but it also poses a series of fraught questions: Where did they come from? What are the social and ecological conditions of their manufacture? Who made them? What is left in their place? Regardless of how much you may want the backstory or to get materials from a specific location, information can be scarce and costs prohibitive. Everyone who specifies materials has absurd stories of how it was cheaper to get something from halfway across the globe than from next door. This is the reality of contemporary logistics, however illogical.

While construction materials may appear to be fixed commodities, they are anything but fixed in time, space, or form. Materials change shape as they travel from geological deposit or forest to factory and design project to landfill, passing through human hands and tools. Think of all of the landscapes a material passes through or is physically contiguous with, the different forms it takes, and the people it interacts with along the way. Geographer David Harvey instructs us to do so by tracing our breakfast. The exercise quickly reveals one's dependence upon, yet obliviousness to, the labor and environmental conditions of daily consumption.[1] Michael Pollan's book The Omnivore's Dilemma: A Natural History of Four Meals, which traces the ingredients of four different meals, has popularized the idea that these everyday products have much to tell us about contemporary North American society and its relationship to food, the people who produce it, and the land where it grows.[2]

That one can eat this food but not taste or know whether workers produced it in adequately waged or even enslaved conditions is what Karl Marx famously called the fetishization of the commodity—the way in which markets conceal the source and labor conditions of its making, and the way in which the consumer of a good is systematically detached from its producer.[3] A commodity, as defined by Marx in Capital, is a valuable, useful, and exchangeable thing. It has

1 David Harvey, "Between Space and Time: Reflections on the Geographical Imagination," Annals of the Association of American Geography 80, no. 3 (1990): 422.

2 Michael Pollan, The Omnivore's Dilemma: A Natural History of Four Meals (New York: Penguin, 2007).

3 Karl Marx and Ernest Mandel, Capital: A Critique of Political Economy, trans. Ben Fowkes (New York: Penguin, 2004), 164–5.

value because human labor made it, it has use-value because someone wants to use it, and its exchange-value, or price, is set by the market. Exchangeable on the market, a commodity is equivalent to like-things from elsewhere: wheat is wheat, stone is stone, regardless of vastly different labor conditions or environmental

Inexhaustible Terrain: Guano from the Chincha Islands, Peru to Central Park, 1862. (Left) Detail of guano deposit and settlement, Chincha Islands, Peru, 1862. Courtesy of New Bedford Whaling Museum.
(Right) Detail of Sheep Meadow looking southwest, Central Park, circa 1905. Photograph by William Hale Kirk. © William Hale Kirk / Museum of the City of New York.

consequences. Accordingly, as land becomes raw material, and raw material becomes commodity, the rift between consumer and producer is ever widened.

This separation is almost too obvious to state as one rarely comes into contact with the person producing (or the land yielding) the goods that one consumes. If human labor and land are obscured through commodification, then tracing the lives of commodities can be an active method of uncovering, and also of de-essentializing, the commodity.[4] While it is easy to take something's commodity status for granted, as Arjun Appadurai argues in The Social Lives of Things, a commodity "is not one kind of thing rather than another, but one phase in the life of some things."[5] Only by observing "commodities-in-motion"—as they meander through commodity status, through various physical states, human relations, and locations—can we begin to understand them.[6]

Commodity chain analyses have typically focused on the economic exchanges between a series of firms, states, and consumers, but examining human labor and experience alongside a material trajectory can offer different insights; I'll cite three examples here. Geographer Elaine Hartwick argues that studying the social and symbolic dimensions of commodity chains brings together the otherwise separate experiences of consumers and producers.

4 Noel Castree, "The Geographical Lives of Commodities: Problems of Analysis and Critique," Social & Cultural Geography 5, no. 1 (March 2004): 23.

5 Arjun Appadurai, ed., The Social Life of Things: Commodities in Cultural Perspective (Cambridge: Cambridge University Press, 1988), 17.

6 Ibid., 16. Within geography, an extensive literature focuses on following the "lives," "chains," "circuits," and "networks" of commodities, in order to better understand how power plays out along these lines and to challenge the idea that commodities are fixed, given entities. See, for example, Peter Jackson, "Commercial Cultures: Transcending the Cultural and the Economic," Progress in Human Geography 26, no. 1 (2002): 3–18.

By being "geographical detectives" and uncovering the material relations of a product, Hartwick writes, one might better engage in meaningful activist praxis to alter these linkages, whether through advocacy campaigns or solidarity movements with workers elsewhere.[7] In a second example, in her book *In the Aura of a Hole: Exploring Sites of Material Extraction*, artist Laurie Palmer travels to extraction landscapes of eighteen elements, from iron to lead to copper, delving into the physical contexts and narratives of people living and working near them.[8] Palmer emphasizes how commodities are embedded in a specific place, and shows us their complicated histories and long-standing human witnesses. Finally, focusing on the end of the construction material trajectory—the assembly of buildings—the project *Who Builds Your Architecture?* (WBYA?) asks architects to address the working conditions of people constructing the buildings they design. Just as material production has become a global enterprise, so too has architecture; designers today design for places far from their familiar contexts, with little connection to the labor conditions in those places.[9] WBYA? asks architects to consider the ethical and political questions that this raises, connecting designers with laborers elsewhere.

If the act of tracing materials and commodities leads to people, it also inevitably leads to land. Tracing wood, stone, iron, and polymers leads to forest communities, sedimentary deposits, iron-rich seams, and fossil-fuel beds. Tracing materials back to the land can reveal how certain properties (the durability of a certain wood or the shininess of a stone, for example) are not merely "useful" attributes, but are physically related to unique, local biophysical conditions. It is easy to see landscapes as "natural resources," as standing reserves of materials ready for the taking, but they are of course more than this. They are complex ecosystems that support many interconnected beings; they are the physical basis of human sustenance and local culture.

At the hinge point between land and commodity, materials teeter uncomfortably between that which is considered natural and that which is not, between that which is intrinsically valuable and between that which is valuable for human use. By focusing on the moment between land and commodity, when a tree becomes fungible, saleable lumber, or when a particular geological deposit becomes a valuable ore, we can witness this continuity and un-see the commodity for just a moment. Compared to materials used in buildings, materials used in landscape architecture are often less processed, or closer to a "raw" form. An eastern white cedar 2×4 and a New York bluestone slab, for example, are recognizably related to the landscapes they come from, and their product names even suggest their geographical source. In comparison to architecture, within landscape architecture, the existing site conditions—soil, vegetation, and contamination—are also "materials" that are inevitably incorporated into the project. To a casual observer, a simple tree planted in a grassy surface may appear completely "natural," but in fact may be a highly manufactured complex including specially bred plant material, chemical fertilizers and additives, engineered soils, and polymer turf.

Because landscape materials are neither clearly natural nor human-made, thinking about them can disrupt unhelpful binaries. Materials shape-shift as they move in and out of human-controlled systems, challenging us to think of them as both formed through human action and also as having lives of their own. If materials are not only for human use, how might we consider them outside of a purely instrumental light? If we could see matter as having agency, how might this affect the way we work with it, build with it, and live with it? Reacting to the post-modern tendency to privilege semiotic readings of the world over physical

7 Elaine R. Hartwick, "Towards a Geographical Politics of Consumption," *Environment and Planning* 32 (2000): 1177–92.

8 Laurie Palmer, *In the Aura of a Hole: Exploring Sites of Material Extraction* (London: Black Dog Publishing, 2015).

9 *Who Builds Your Architecture? A Critical Field Guide*, 2017. "WBYA_Guidebook_spreads.Pdf," accessed October 21, 2018, http://whobuilds.org/wp-content/uploads/2017/02/WBYA_Guidebook_spreads.pdf.

ones and to separate meaning from matter, materialist thinkers—from feminist and queer studies to science and technology studies to political science—have offered a range of modes for thinking through these questions.[10] Matter, as feminist theorist Karan Barad argues, "is not little bits of nature, or a blank slate, surface or site passively awaiting signification, . . . immutable or passive."[11] Instead, because matter intra-acts within the world, it is inherently agentic, discursive, and an important participant in the making of the world.[12]

Range of Motions: Granite from Vinalhaven, Maine to Broadway, 1892.
(Left) Detail, Sands Quarry in Vinalhaven, Maine, 1907. Photograph by T.N. Dale. U.S. Geological Survey Bulletin 313: 1907. U.S. Geological Survey Department of the Interior/USGS.
(Right) Detail, paving and construction of cable car line on Broadway, 1891. Photograph by C.C. Langill and William Gray. Photography Collection, Miriam and Ira D. Wallach Division of Art.

While we typically focus on the ways in which humans control, shape, and transform matter, the physical qualities of matter are powerful in their own right, reciprocally shaping human activity. In studying extractive industries in the Amazonian basin, geographers Stephen Bunker and Paul Ciccantell remind us of how the entire industrial apparatus of technology, commodity, and market is constrained by the physical qualities of the materials themselves.[13] It is the heaviness of certain ores, for example, which truly drive industrial location, and a material's exploitation will be determined not only by its useful properties, but also its non-useful ones. As such, geographers Karen Bakker and Gavin Bridge urge us to pay attention to all of the ways that materials don't "cooperate," and how their unpredictability or unruliness might disrupt or irritate capital accumulation.[14] Why consider such nuance? To do so challenges understandings

10 See for example, Jane Bennett, Vibrant Matter: A Political Ecology of Things (Durham: Duke University Press, 2009); Peter Jackson, "Rematerializing Social and Cultural Geography," Social & Cultural Geography 1, no. 1 (September 1, 2000): 9–14; Sarah Whatmore, "Materialist Returns: Practicing Cultural Geography in and for a More-Than-Human World," Cultural Geographies 13 (2006): 600–9.

11 Karen Barad, "Posthumanist Performativity: Toward an Understanding of How Matter Comes to Matter," Signs: Journal of Women in Culture & Society 28, no. 3 (Spring 2003): 801.

12 Ibid., 821–3. Geographer Juanita Sundberg reminds us of how post-human theory has also had a tendency to reproduce colonial relationships, by asserting totalizing narratives, See Juanita Sundberg, "Decolonizing Posthumanist Geographies," Cultural Geographies 21, no. 1 (2004): 33–47.

13 Stephen G. Bunker and Paul S. Ciccantell, "Globalizing Economies of Scale in the Sequence of Amazonian Extractive Systems," in Globalization and the Race for Resources (Baltimore: JHU Press, 2005), 33.

14 Karen Bakker and Gavin Bridge, "Material Worlds? Resource Geographies and the 'Matter of Nature'," Progress in Human Geography 30, no. 1 (February 1, 2006): 18.

of materials as inert and wholly subservient to human agendas; this alone is an important starting point for seeing materials (and the more-than-human world that they comprise) as more than stuff to use.

Material Exchange

At the scale of the planet, humans metabolize matter for construction and agriculture at a rate ten times that of global geological processes alone.[15] Humans have always reshaped their environments; however, as environmental historian J. R. McNeill has meticulously documented, due to spiking population, rising per capita consumption, the mass production of consumer goods, infrastructure, urbanization, and war during the 20th century, this anthropogenic transformation has accelerated as never before.[16] For the first time, the magnitude of *local* human activities has produced new *global* conditions in the lithosphere, biosphere, hydrosphere, and atmosphere of the earth.

A study of the global consumption of materials over the 20th century, compiled by Fridolin Krausmann and colleagues, shows that over the last hundred years, the earth's social and industrial metabolism—the inputs and

Rivers of Steel: Steel from Pittsburgh to Riverside Park, 1937.
(Left) Detail, view looking east along the Monongahela River towards Carrie Furnaces, 1959. Pittsburgh & Lake Erie Railroad Company Photographs, 1886-1972, University of Pittsburgh Archives and Special Collections.
(Right) Detail, Riverside Park under construction, view looking south from 82nd Street, 1936. Milstein Division, The New York Public Library.

wastes associated with human-driven developments—exploded: global material consumption multiplied eight-fold, skyrocketing in the post-war period, now reaching around 60 gigatons of material per year.[17] Not only did the *scale* of material use change; its *composition* changed as well. While at the beginning of the 20th-century humans consumed primarily biomass materials (crops, fodder, and wood), as the century progressed there was a switch to minerals, reflecting a shift from agrarian to industrial economies. By the end of the century, humans extracted and used 34 times as much construction minerals (cement, asphalt, sand, and gravel), and 27 times as much metal and industrial minerals (iron,

15 Bruce H. Wilkinson, "Humans as Geologic Agents: A Deep-time Perspective," *Geology* 33, no. 3 (2005): 161–4, 161.

16 J.R. McNeill, *Something New Under the Sun: An Environmental History of the Twentieth Century World* (New York: WW Norton, 2001).

17 Fridolin Krausmann, Simone Gingrich, Nina Eisenmenger, Karl-Heinz Erb, Helmut Haberl, and Marina Fischer-Kowalski, "Growth in Global Materials Use, GDP and Population during the 20th Century," *Ecological Economics* 68, no. 10 (August 15, 2009): 2699.

copper, aluminum, etc.), as they had in 1900.[18] This change in consumption signaled a material paradigm shift: from organic to mineral, from renewables to finite resources, and from materials that move quickly through society (like biomass and combusted fuel) to those which accumulate and reside in a place (like metals and concrete in urban infrastructure).[19] As urban areas expanded, infrastructure multiplied, per-capita material consumption ballooned, and wars raged, these materials—mostly sand, aggregates, cement, and metals—migrated and accumulated in new strata around the planet.

Krausmann's study illustrates the coupling of material extraction and capital accumulation. As GDP soared, so too did material and energy consumption. The only lulls in the world's upward consumption occurred during periods of economic stagnation, during the global economic crisis in the 1930s, World Wars I and II, and the oil crisis of the 1970s.[20] And while some improvements of material efficiency occurred, these efficiencies or "dematerializations" never led to a reduction in consumption; on the contrary, ever-new mechanisms for consumption emerged.[21] This tight pairing between materials and capital suggests something profound about the history of capitalism; as Jason W. Moore puts it: "Natures were appropriated. Capital was accumulated. Wastes were dumped overboard."[22] The material exploitation shown in Krausmann's graph, and its associated environmental changes, are not a consequence of capitalism at work, but rather capitalism's ecological modus operandi.[23] Capitalism, Moore argues, is a system predicated on the creation of what he calls "cheap natures": cheap labor, food, energy, and raw materials; when these cheap materials are exhausted in one place, capitalism moves to the next. And likewise, the anthropogenic ecological crises that we witness today are not the system malfunctioning; they reflect instead the logical outcomes of capital accumulation based on using things up as if there were no limits or costs.[24]

This global material flow plays out in highly differentiated ways on the ground: deeper quarries in one place, material improvements in another; toxic deposition in one place, refined minerals put to use in another. Acknowledging that certain places and people (typically capitalist core nations or cities) gain resources and benefits at the expense of others (typically in the so-called periphery) is what Alf Hornborg calls the "zero-sum-world" perspective.[25] Research into how the use of materials (or "resources") is structurally inequitable and geographically distributed has identified linkages between material flow analysis, ecological conflicts, and the notion of ecologically unequal exchange.[26] Looking along the material chain from extraction to production, one can observe some broad yet basic tendencies that point to how one instance of material exchange can produce extremely different realities in different places: 1) Finished products are priced disproportionately higher than the raw materials used to produce them, which incentivizes more material processing.[27] 2) Local extractive economies (often in poorer areas) tend to decrease in power over

18 Ibid.

19 Ibid., 2701.

20 Ibid., 2702.

21 Ibid.

22 Jason W. Moore, Capitalism in the Web of Life: Ecology and the Accumulation of Capital (New York: Verso, 2015), 291.

23 Ibid., 111–40.

24 Ibid., 291–305.

25 Alf Hornborg, "Zero-Sum World: Challenges in Conceptualizing Environmental Load Displacement and Ecologically Unequal Exchange in the World-System," International Journal of Comparative Sociology 50, no. 3–4 (June 1, 2009): 237–62.

26 See Joan Martinez-Alier, The Environmentalism of the Poor: A Study of Ecological Conflicts and Valuation (Cheltenham: Edward Elgar, 2002); Alf Hornborg, "Towards an Ecological Theory of Unequal Exchange: Articulating World System Theory and Ecological Economics," Ecological Economics 25, no. 1 (April 1998): 127–36.

27 Hornborg, "Towards an Ecological Theory of Unequal Exchange".

time as available ores become less pure, scarcer, and more remote. The wealth of these economies is based on rates of natural production, typically slower than desired, and so to extract more is to over-harvest and degrade one's own resources.[28] 3) Core industrial economies that process and finish material products tend to increase in power over time: they acquire cheaper and greater access to raw materials, develop technology and infrastructure to increase extraction and transportation, and then develop financial instruments and state collaborations to acquire even cheaper materials in still greater quantities.[29] Finally, 4) core countries tend to export their polluting industries to poorer countries.[30]

If the process of material exchange is often deeply unequal, why use the term "reciprocal"? Reciprocity is a mechanistic word with a beautiful meaning: it connotes a gift exchange, a give-and-take, a relationship of mutual benefit. Contemporary urbanization through globalized capitalism is anything but reciprocal. Alf Hornborg writes that one of the major illusions of sustainability discourse is the assumption that market prices indicate a reciprocal relationship.[31] Botanist and Potawatomi writer Robin Wall Kimmerer has written in-depth on the concept of reciprocity, and of the mutual interdependencies that she observes as a plant scientist and student of indigenous knowledge. Kimmerer likens reciprocity to gratitude: that to be alive, to build, to eat, or to make art, is to exchange with others, and to recognize this is to be thankful. She writes of how the traditional Haudenosaunee Thanksgiving Address, repeated for generations, is a refrain for this gratitude and also establishes a political document and social contract.[32] "If we want to grow good citizens," Kimmerer continues, "then let us teach reciprocity."[33] In my book, Reciprocal Landscapes, the word reciprocal is not intended to soften, conceal, or suggest equivalence between the sites of production and consumption. Rather, "reciprocal" is used in an aspirational sense. When joined with "landscape," it suggests the inextricable interdependencies that humans share with the more-than-human world, that consumers share with producers, and that all beings and things share with each other. By tracing each material, examining the unequal dynamics of exchange along its path, and probing a project's ideological agendas alongside these material relations, these cases offer a set of points from which more lines can be drawn. Moving back and forth between the distant production site and designed landscape, the aim is to bring them, at least conceptually, closer together. Reciprocal Landscapes is above all a thought experiment: What if we looked at materials not simply as single-purpose products or commodities, but instead as continually changing matter that takes different forms, and is shaped by—but also shapes—others? And more broadly, how might understanding these so-called externalities of development inflect new forms of material practice in solidarity with people, other species, and landscapes elsewhere?

This text is an excerpt from the author's book titled Reciprocal Landscapes: Stories of Material Movements (London: Routledge, 2019).

28 Bunker and Ciccantell, "Globalizing Economies of Scale in the Sequence of Amazonian Extractive Systems," 225.

29 Ibid., 224.

30 Roldan Muradian and Stefan Giljum, "Physical Trade Flows of Pollution-Intensive Products: Historical Trends in Europe and the World", in Rethinking Environmental History: World-system History and Global Environmental Change, eds. A. Hornborg, J.R. McNeill and J. Martinez-Alier (Walnut Creek, CA: AltaMira Press, 2007), 307–25.

31 Hornborg, "Zero-Sum World," 256.

32 Robin Wall Kimmerer, Braiding Sweetgrass: Indigenous Wisdom, Scientific Knowledge and the Teaching of Plants (Minneapolis: Milkweed Editions, 2015), 115.

33 Ibid., 116.

About the author

Jane Hutton is a landscape architect, teaching at the University of Waterloo School of Architecture. Her research looks at the extended material flows of common construction materials. Recent books include *Reciprocal Landscapes: Stories of Material Movements*, *Landscript 5: Material Culture*, and *Wood Urbanism: From the Molecular to the Territorial*, co-edited with Daniel Ibañez and Kiel Moe.