Reciprocal landscapes: material portraits in New York City and elsewhere

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Abstract

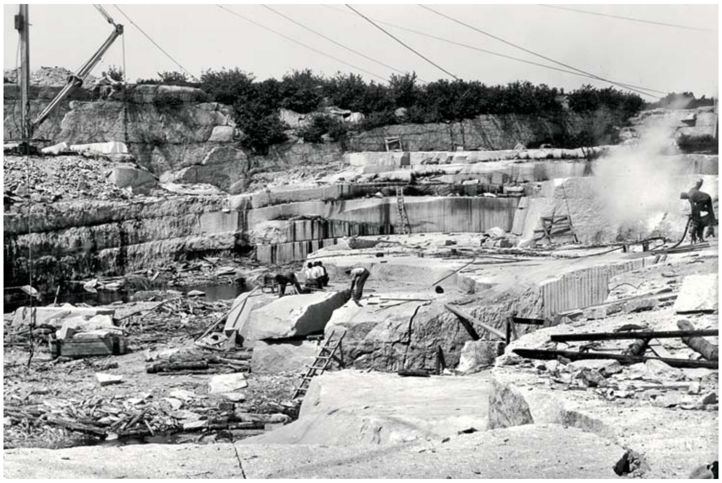
The material assemblies of constructed landscapes generate ecological, economic and social conditions in situ, yet are embedded with the relations of their own production, concealed through the processes of commodification. Material specification for the design of new landscapes inadvertently and invisibly transforms other landscapes. The author argues that the sites and people associated with the production of construction materials are an overlooked yet critical dimension to understanding and intervening in the material cycles of designed landscapes. Case studies identify reciprocal relationships between landscapes of production and consumption in terms of material displacement, ecological change and labour relations. Cases focus on materials used in three public landscapes in New York City over the past century and a half: granite block from Maine to Central Park in the late nineteenth century, structural steel from a company town in Pennsylvania to Riverside Park in the 1930s and hardwood lumber from northern Brazil to the High Line in the early twenty-first century.

Central Park / construction materials / High Line / material sources / Riverside Park

In the twenty-first century, the rate of material movement from construction and agricultural activity surpassed, by an order of ten, that of geological processes (*Wilkinson 2005: 161*). Designers participate in this monumental shifting, reorganization and recycling of materials around the globe, the great majority of which is bound as urban parks, buildings and highways. [1] These accumulated urban stocks produce at once ecological (the material exchanges produced through construction), economic (the trade made possible through infrastructural networks) and social (the discourse enabled through the public commons) conditions in situ. At the same time, the construction materials that designers specify are implicated in the ecological, economic and social relations of their own extraction, production and reuse. Materials in landscape architecture are physical fragments of remote quarries, factories and forests and their production is responsible for landscape transformation elsewhere. This reality is abstracted and concealed through the commodity form and is an overlooked, yet critical consideration for the discipline of landscape architecture today. [2] This paper argues that the study of paired landscapes of production and consumption generates a spatial framework for examining the social and ecological relations of their material exchange.

While much of the focus on materials in landscape architecture has been dedicated to their role in construction assemblies, a range of recent texts have explored the dynamics of materials beyond a single state. These writings address change due to temporal processes such as weathering, [3] dynamic systems involving planting and innovative materials [4] and include references for evaluating the environmental impacts of site materials including the Sustainable Sites Initiative. [5] Evaluation criteria for such systems foreground the cyclical nature of materials used in design, examining multiple lifecycle states and considering issues related to the inputs and outputs of production and disposal. At the same time, they are necessarily reductive in order to produce generalizable principals, further reifying materials into products.

Four precedents for describing discrete relationships between remote landscapes, people and things, are cited here as methodological prompts. In a series of Non-Sites, Robert Smithson assembled quarry materials next to representations of the sites from which they were gathered in the same gal-



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NEW YORK HISTORICAL SOCIETY

Figure 1 Sands Quarry in Vinalhaven, Maine, owned by the Bodwell Granite Co. *U.S. Geological Survey Bulletin* 313: 1907. U.S. Geological Survey, Department of the Interior/USGS

Figure 2 *top right* South Gate House, Central Park, 1891. [neg #62683]

VINALHAVEN HISTORICAL SOCIETY

Figure 3 Granite cutters from the Bodwell Granite Co. marking the government contract (1872–1888) for the State, War, and Navy Building in Washington D.C. J. P. Armbrust Collection

lery space. Through the displacement of rocks and sand between quarry and gallery, this work challenged viewers to consider the 'double reflective void occurring between two places and two ways of looking' (*Hobbs 1981: 111*). In a 1990 text, David Harvey challenged geography students to trace their last meal through the places, objects and hands that produced them (*Harvey 1990: 22*). These analyses of everyday landscapes and objects provide insight into how, as Harvey writes, 'the rules of capital circulation and accumulation … get tangibly expressed and actively re-shaped through socio-ecological processes' (*Harvey 2006: 78*). Elaine Hartwick's geo-materialist approach to analyzing commodity chains links stories of producers and consumers as a crucial political project for radical geography (*Hartwick 1998 and 2000*). Finally, Bruno Latour's Actor-Network-Theory (2005) and William Cronon's tome on the development of Chicago and the Great West (1991) foreground the myriad human and non-human agents (including abiotic materials and sites) involved in the formulation of landscapes. This paper draws from Smithson's practice of juxtaposing the representations of production sites and designed sites, Harvey's challenge to trace an everyday object in order to de-objectify it, Hartwick's narration of linkages between production and consumption, and Latour and Cronon's shared insistence on the relationship between multi-variate actors.

Three cases are examined, each consisting of two sites tethered by the movement of a particular building material from one to the other. The cases represent significant instances of landscape construction in New York City over 150 years in relation to distinct economic periods. The first looks at granite from coastal Maine used in the southern reservoir house in Central Park during the prime of industrial capitalism of the late nineteenth century. The second case links Ambridge, Pennsylvania—the company town of the American Bridge Co.—with structural steel used in Riverside Park during the Keynesian New Deal programmes of the 1930s. The third case looks at *Tabebuia sp.* (ipê) lumber from northern Brazil used in the first construction phase of the High Line, reflecting relations of production during the current neoliberal period. Far from a comprehensive history of the material practices of the past century and a half, these three cases instead present portraits. These portraits examine a physical link between two places: an emblematic landscape architecture project and an associated quarry, factory or forest.

Fox Islands, Maine / Central Park, New York City, 1863

The archipelago of the Fox Islands in Penobscot Bay, Maine, is underlain with a massive body of pink granite. In an 1880 report, geologist Nathanial Shaler remarked that the stone of Penobscot Bay 'opens easily, having the peculiar inchoate joints that are such striking features in the syenite or granite of New England … the lines of weakness in the rocks are not so numerous as to make the quarried masses too small for use' (*Rich 1892: 748*). The granite's workability, smooth grey coloration and desirable polish, as well as the promise of exceptionally large blocks, made Penobscot Bay granite desirable for a range of building and paving applications (Fig. 1).

The string of small islands provided an interminable shoreline with quarries so close to ports that cut rock could be loaded directly onto sloops headed for Boston, New York, Philadelphia and Washington, DC (*Merrill 1891: 184*). By the turn of the nineteenth century, the state of Maine produced more granite than any other; profitable government contracts for federal buildings, post offices, bridges and new paved boulevards through the urbanizing capital cities of the states had established a fluctuating workforce (*Grindle 1976: xi*). The largest of the Fox Islands, Vinalhaven, nearly doubled in population from 1850 to 1880, the period that saw massive granite blocks sailing south to be stacked at the East River Bridge, DC's State Department Building and erected as columns at St. John the Divine in New York (*Grindle 1976: 51*).

In 1862, the Board of Commissioners of the Central Park (BCCP) reported the completion of nearly all ornamental bridges, the transverse roads at 86th and 97th streets and final grading in the reservoir (19). Newly contoured land, assembled bridges and planted woods were achieved through a massive reorganization of existing top-soil, earth, rock and vegetation from the inhabited land that was cleared to make way for the park (BCCP 1861: 9). Of those materials brought in from off-site, the farthest-flung elements were small or singular, such as the encaustic tiles in the Bethesda Terrace roof, made by the Minton Company from Trent, England, and bronze sculptures cast in the foundries of Paris, Munich and Barcelona. The majority of materials, however, came from New York or neighbouring states. Various masonry block types were transported by boat and train from Upstate, including variegated gneiss from Westchester County and greywacke from Hudson Valley, and from out of state, including yellow and white brick from Milwaukee, sandstone from New Brunswick and granite from coastal Maine (*BCCP 1861: 86*).

As the Central Park reservoir was first filled with water, 700 km to the northeast '60 to 120 men and ten pair of oxen' were cutting stone in Spruce Head Quarry of the Fox Islands for the reservoir's gatehouses (*Grindle 1977: 7*); see Fig. 3. Successes with other large New York contracts led to the purchase of Spruce Head Quarry by Bodwell Granite Company, ringleader of the Granite Ring. So-called 'Fifteen Per Cent Contracts' on government work guaranteed a hefty profit for quarry owners. In the face of Bodwell's success, and the unstable nature of unregulated work contracts, hazardous work environments and dust inhalation due to new machinery, workers began organizing to form a union, meeting first on Clark Island in 1877. Due to fluctuations within the larger economy and the industry itself, their efforts to organize were not easy. By 1878, Bodwell ordered the dismissal of thirty major union members in its payroll, provoking a walk out and eventual strike (*Grindle 1976: 58*); see Fig. 3.

To protect New York cutters from competition with 'cheap labour' in Maine, the 1894 Tobin Law stated that all stone used for New York municipal or state projects would be processed on site. When the New York City Board of Public Works ruled that this law included paving blocks, Bodwell fired all seventy-five of its Vinalhaven cutters (Grindle 1976: 88). Later the same year, when the law was amended, Vinalhaven's industry entered a new boom time, sending thousands of tons of blocks to Portland, Boston and New York (Grindle 1976: 89). Fluctuating demand for masonry construction in urbanizing centres alongside the advent of concrete and steel construction would continue over the next twenty years, producing boom–bust conditions and precarious employment for the granite cutters of the Fox Islands. The Bodwell Company sold out in 1919, and although quarrying continued on the islands sporadically until the end of the Second World War, this closure was symbolic of the end of peak granite extraction in Maine. The eventual demise of the granite industry in the Fox Islands, driven by competition from cheaper granite in international markets, left behind an archipelago of abandoned quarries. Today these quarries have been reclaimed as swimming holes as part of the local landscape of tourism.

Ambridge, Pennsylvania / Riverside Park, New York City, 1937

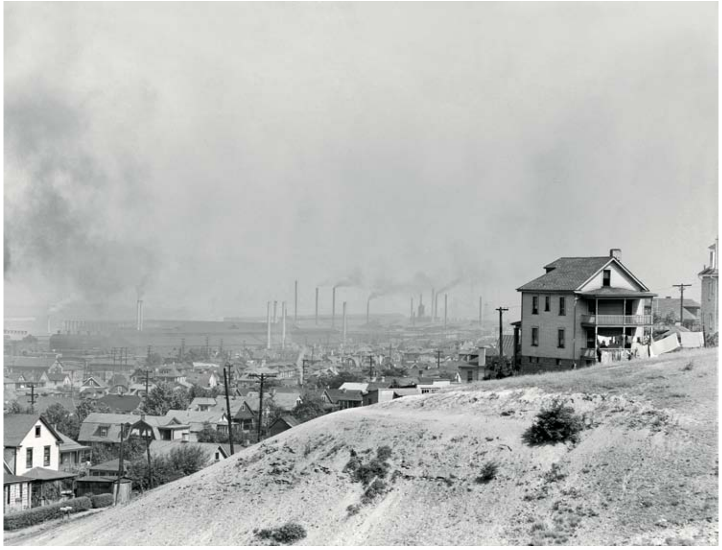
At their convergence the Allegheny and Monongahela rivers carve a 40-degree angled landmass–Pittsburgh's Point–and spawn the Ohio River. Pittsburgh's early foundries and mills aggregated around the Point, but development spread rapidly along the three rivers' shores at the turn of the twentieth century. Large, sloped, meandering river sites were optimal for new open-hearth plants that required more riverfront land. Down the Ohio River, the American Bridge Company plant was just one of some 140 riverfront iron and steel works within a 30-km radius of the Point in 1906 (*Warren 1973: 134*). The company purchased a town formerly known as 'Economy', which had been settled in 1824 by the Harmony Society—a German-Christian pietist community—to establish Ambridge, its own namesake (*Slater 2008: 7*). Ambridge rapidly developed Economy's farmland with a grid of streets, workers' housing and the world's largest structural steel fabrication plant at the time—57 ha—along the riverfront (Fig. 4).

The American Bridge Company, formed through J. P. Morgan's consolidation of twenty-eight steel manufacturers in 1900, was soon after brought into the United States Steel Corporation—the world's first $1 billion company. The population of Ambridge quadrupled between 1910 and 1929, as the company expanded, other industrial giants arrived and steel workers immigrated from Europe (Slater 2008: 41). Geographic proximity to large urban centres, connectivity by rail, and changing sources for coke and iron, underwrote the successes of the steel industry. In 1928 for example, some 517,000 metric tons, or nearly a third of the nation's total steel orders, landed in New York City (Warren 1973: 180).

The Stock Market Crash of 1929 halted operations in Ambridge, with sporadic one- and two-day workweeks supported by few contracts (Slater 2008: 61). In 1933, the *Chicago Daily Tribune* reported a partial contract for the San Francisco Bay Bridge and four 150-m steel towers reignited operations at the American Bridge Company plants in Ambridge and Gary, Indiana. These and other public works contracts supported through New Deal legislation, and later contracts related to the Second World War, were to become the company's mainstays.

The National Industrial Recovery Act of 1933, signed as part of Roosevelt's New Deal legislation, authorized governmental regulation of industry and protected collective bargaining rights for unions. This stimulated steelworker efforts to unionize and in the same year labour protests in Ambridge resulted in violent clashes at the Spang-Chalfant tubing plant, and the closure of four other plants (*Wall Street Journal* 1933: 9); see Fig. 5. Widespread organizing led to the formation of the Steel Workers Organizing Committee and its 1937 collective bargaining agreement with the United States Steel Corporation, American Bridge's parent company.

In New York City, the Public Works Administration, also part of the New Deal, was responsible for the construction of major infrastructure projects that consumed massive quantities of steel. Many of these projects were focused on routes out of the city or 'new avenues of escape from the island of steel and stone' (*Vogel 1932: A24*). The West Side Improvement, finally implemented in 1937 under Robert Moses's lead, introduced the elevated rail High Line in Lower West Manhattan and linked the West Side Elevated Highway with the Henry Hudson Parkway running from 72nd Street through Riverside Park up to Van Cortland Park. Moses's skilful managerial and spatial entanglement of highway, rail and park budgets and agencies mobilized construction funding and emergency relief labour (*Caro 1975: 535*).



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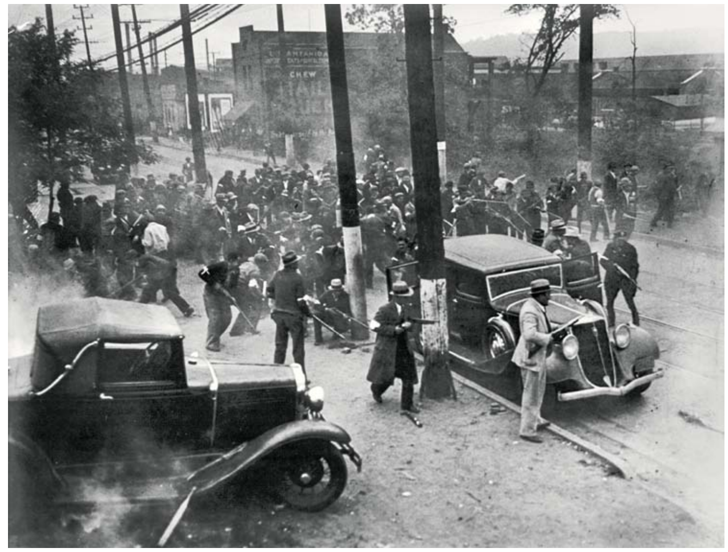

WORLD WIDE PHOTOS

Figure 4 Houses and steel mills in Ambridge, Pennsylvania, 1938. Library of Congress, Prints & Photographs Division, FSA/OWI Collection [LC–USF34–026531-D]

Figure 5 *top right* Armed deputy sheriffs confronting picketers at the Spang-Chalfant Seamless Tube Company, Ambridge, Pennsylvania, 1993. Library of Congress, Prints & Photographs Division [LC-USZ62-26197]

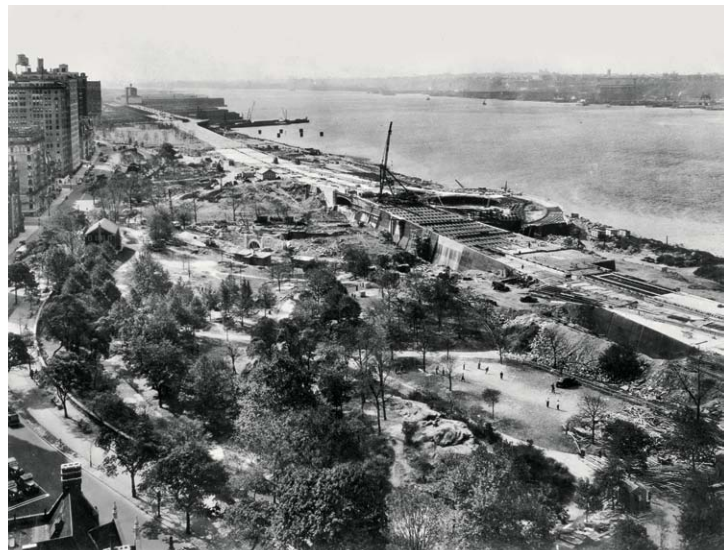

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Figure 6 Riverside Park at 82nd Street under construction, showing steel frames installed over the New York Central Railroad tracks, 1936. Milstein Division of United States History, Local History & Genealogy, The New York Public Library, Astor, Lenox and Tilden Foundations

A bill signed by Senator John Buckley authorized funding for relief workers to begin roofing the New York Central Railroad tracks in Riverside Park. 'West Side Project Ready to Hire 4,000: Needy to Get the Jobs', a *New York Times* headline proclaimed (*1934: 1*).

Olmsted and Vaux's plan for Riverside Park, realized in 1900, negotiated the steep slopes between Riverside Drive and the New York Central tracks and Hudson River to the west. In the years that followed, the expanding rail infrastructure and associated structures brought 'smoking locomotives and sometimes odorous live freight' adjacent to what had become an upper-class neighbourhood (*Sweeny 1937: 14*). The land between the rail tracks and the Hudson River was inaccessible and increasingly filled with railroad structures and used as a dump. While countless proposals to reduce the railroad's impacts were made, the covering of the rail tracks with a seamless landscaped surface and the extension of the shoreline with fill became the keystone of Moses's West Side Improvement. The plan promised a landscape 'ungashed by railway cuts and no longer disgracefully fringed with railroad freight yards and unsightly dumps' (*New York Times 1936a: E10*).

The roofing of the rail tracks, smoothing of the grade between Riverside Drive and the Hudson River, and integration of parkway and promenade, produced 53 new hectares of parkland valued at $23,760,000. In the promotional document published at the park's opening in 1937, a photograph of the rail tunnel with thin beams of light streaming in is labelled 'Above these covered tracks are grass, trees, and sunlight' (*Sweeny 1937: 49*). While appearing as a continuous landmass planted with trees and shrubs, this new sinuous landscape required 45,000 metric tons of structural steel (20). Rail tracks were covered with frames of 23-m-long riveted steel girders spanning two piers (*Historic American Engineering Record 2006: 65*). By January of 1936, 'literally acres of steel and concrete' had been installed (*New York Times 1936b: xx6*) and an additional 5,400 metric tons of structural steel had been ordered from the American Bridge Company to cover New York Central's tracks (*Wall Street Journal 1936: 3*); see Fig. 6.

The renovations to Riverside Park wielded New Deal funding and labour, the sectional arts of landscape architecture and the structural capacity of steel choreographed rail, pedestrian and vehicle movement into a highly constructed, connective landscape. Rail freight from inland manufacturing regions entered the city under the turfed surface of Riverside Park and along the West Side. Above grade, the Henry Hudson Parkway was a new connective typology—a privileged means for escaping the difficulties of the city and consuming the exurban as a landscape of leisure (*Gandy 2003: 125*). Even at a small scale, however, West Side amenities were unevenly connected. Between 125th and 155th streets adjacent to Harlem, the tracks remained uncovered and no investment in parkland was made. African-American populations continued to be subjected to the smells and 'never-ending clanking' of the railroad, still open to the air (*Caro 1975: 557*).

American Bridge's Ambridge operations were shut down in 1984 as competition from offshore steel production mounted. In 1988, American Bridge was sold to a Taiwanese company, who still maintains the company now headquartered in Coraopolis, PA (*Gaynor 2000*). Ambridge's population today is close to that of 1910. Its industrial heritage is most prominently celebrated in the form of Old Economy Village, a National Historic Landmark that interprets the Harmony Society's material culture and industry (*Old Economy Village 2013*).

Figure 7 Logs and recently milled ipê (*Tabebuia sp.*) lumber, Belém, Brazil, 2012

Para, Brazil / The High Line, New York City, 2009

Tabebuia serratifolia and *T. impetiginosa* can reach heights of 50 m and nearly 2 m in diameter, and are among the set of species collectively marketed as ipê lumber. In Brazil, they are known as ipê amarelo (yellow) and ipê roxo (purple) for the brightly coloured flowers that appear in the spring and make them desirable street trees in the country's capitals. Their heartwood is embedded with bio-chemicals known as extractives that make the wood exceptionally rot-resistant and their fibre cells have thick walls that render notably dense and hard lumber. This wood is so dense that it sinks in water and so hard that it must be pre-drilled before assembling. These qualities, derived partially from the very slow growth rate that characterizes the species, make the lumber a valuable commodity, worth some $450 US per cubic meter (*Lentini, Pereira, Celentano & Pereira 2005: 111*); see Fig. 7.

The species are distributed from Peru to Mexico, but individuals appear at very low densities—a single mature tree may be found every 3 to 10 ha in the Brazilian Legal Amazon (*Schulze, Grogan, Uhl, Lentini & Vidal 2008: 2,077*). Like other slow-growing, light-dependent species, populations are composed of large, mature adults and few juveniles (*Schulze et al. 2008: 2,081*). The demand for valuable and sparsely distributed trees like ipê, and in particular *Swietenia macrophylla* (big-leaf mahogany), has been a significant driver of illegal logging in the region. The pursuit of high-value species has pushed the logging frontier further and further into unlogged forests, catalyzing road construction and agricultural production (*Geist & Lambin 2002: 150*). Facing commercial extinction, mahogany was listed in Appendix II of the UN Convention on International Trade in Endangered Species (CITES) in 2002. As ipê species share ecological traits and similar market desirability to mahogany (ipê exports have increased by 500 per cent between 1998 and 2004), ecologist Mark Schulze and his colleagues conclude that ipê, 'are the new mahogany' (*2008: 2,072*).

The year 2012 saw the lowest rates of deforestation in the Brazilian Amazon since monitoring began in 1988 (*BBC 2012*) due to stricter governmental controls and improved surveillance. Nevertheless, illegal activity is estimated to represent more than 35 per cent of all current logging in the Brazilian Amazon (*Lawson 2010: xvii*) and has been linked to a spectrum of exploitative labour practices including slavery by debt (*Fearnside 2008: 30*). In the 1990s, campaigns aiming to stem illegal logging and its attendant problems turned from boycotts to market-based strategies linking economic growth with land protection (*Zhouri 2004: 70*). Among these was the development of the Forest Stewardship Council (FSC) in 1993, which has become the most recognized third-party forestry certification system in the US. Brazilian certification has been considered a success: 7 million ha of Brazilian forest have been certified by the FSC since the programme began (*2012: 3*).

Ipê and other tropical lumbers rose in popularity in municipal projects in New York City as the widespread use of chromated copper arsenate (CCA) treated softwoods was deemed unsafe. The rot resistance and durability of tropical hardwoods like ipê, cumaru (*Dipteryx odorata*), greenheart (*Ocotea rodiei*) and garapa (*Apuleia leiocarpa*), has made them valuable for public applications. Ipê has become the most popular tropical lumber in the multi-billion dollar US decking market (*Smith & Cossio 2008: 21*) and has been widely used in prominent, large-scale projects in New York, including the Coney Island boardwalks, site furnishings in the Hudson River Park and decking and benches on the High Line.

The High Line opened in 1934 as part of the West Side Improvement, alleviating the dangerous conflicts between freight and pedestrian traffic of 10th Avenue known as 'Death Avenue'. The 2003 international competition to design a public park on the High Line emblemized the reclamation of the infrastructures of New York's industrial age–infrastructures made obsolete by the shifting of industry elsewhere. The winning team of James Corner Field Operations and Diller Scofidio + Renfro spoke of transforming the elevated rail infrastructure into a 'post-industrial instrument of leisure, life, and growth' (*High Line 2013*). A few months after the much celebrated opening of the first phase, members of the Rainforests of New York campaign unfurled a 10-m-long banner on West 17th Street amphitheatre's ipê bleachers that read, 'High Crime on the High Line: FSC Lies, Amazon Wood is Not Sustainable' (Fig. 8). [6] The campaign, initially supportive of using FSC-certified lumber in public works, later became sceptical that certification was a reliable indicator of sustainable production. They cite New York City as the largest consumer of tropical lumber in North America and have been advocating against its use in municipal procurement since 1995 (*Keating 2012*).

RAINFORESTS OF NEW YORK

JANE HUTTON

Figure 8 Rainforests of New York demonstration on Phase 1 of the High Line, New York City, 2009

Figure 9 Reclaimed teak benches in Phase 2 of the High Line, New York City, 2011

This activism has contributed to a changing public discourse about tropical wood use in New York City. In a 2008 address to the United Nations General Assembly, New York City's Mayor Bloomberg committed to reducing the city's tropical hardwood consumption by 20 per cent (*Chan 2008*). New York City Parks and Recreation has since stopped using tropical lumber in park benches and wood alternatives are being tested in pilot projects around the city. Phase 2 of the High Line, launched in 2011, was constructed with oil-treated teak from demolished industrial and agricultural buildings from Indonesia, in lieu of ipê (*Associated Press 2011*); see Fig. 9.

The High Line, admired for its identity as ultimately local—with its reference to an industrial past and the pioneering vegetation that had occupied the abandoned rail line—was a strategic location from which to invoke the very distant and abstract consequences of ipê use. While many mechanisms such as the FSC work towards minimizing risk of illegally traded wood and promoting best-practice forestry, the worst-case scenario implications—including exacerbation of deforestation and slave labour—are more than daunting issues to navigate.

Conclusion

The landscapes of the Fox Islands, Ambridge and the Amazon Forest of northern Brazil are linked to Central Park, Riverside Park and the High Line, respectively, through the movement of stone, steel beams or lumber from one to the other. They represent a coastal quarry reliant on marine transport, an inland fabricator tied to rail networks and iron suppliers and a distant forest linked by truck and marine networks. Each of the New York City landscapes emblemizes a specific relationship between the city and elsewhere: Central Park brought a civilizing nature to urban dwellers newly divorced from the countryside; the covering of the rail tracks at Riverside Park constructed an automotive escape from the city to exurban areas newly conceived as landscapes of leisure; and the High Line provided a precedent for the re-inhabitation of urban infrastructure made obsolete through the transfer of industrial production overseas. These three cases are linked through design ambitions and infrastructural vision—as Olmsted and Vaux planned both Central and Riverside parks—and the West Side Improvement encompassed both the renovation of Riverside Park and the construction of the elevated High Line.

Within each set of paired sites, both landscapes are transformed by simultaneous economic forces, but shaped to unequal effects. The concentration of capital and construction in urban projects such as Central Park during the late nineteenth century controlled the cycles of boom and bust employment for granite cutters of the Fox Islands, stimulating the organization of a trade union. The advent of new, cheaper technologies and later, access to cheaper labour elsewhere eventually led to the industry's decline in the state of Maine. In the 1930s, New Deal legislation both facilitated the construction of massive infrastructural works as well as stimulated the widespread organization of trade workers. The case of ipê lumber highlights contemporary conditions of globalized neoliberalism with its increasing expansion of material circulation through international markets, the outsourcing of ecological risks and the precarity of workers.

At stake for landscape architecture in considering these expanded material relationships are implications for both theory and practice. Recent contributions within the field have proposed the expansion of sites and scales that landscape architects might practice in, as well as the consideration of ecological processes, material flows and the principles of industrial ecology as generative for design. [7] Conceptualizing the sites of material production as integral—rather than external—to design would shift theoretical concerns of the landscape project without necessarily shifting its site boundary. This has the potential to both examine the ways in which non-adjacent spaces are designed contiguously, but also to speculate about how these reciprocal relationships might be designed themselves.

In practice, while refining material evaluation systems and increasing access to information facilitate knowledgeable and timely material specification, a more complex understanding of the social, ecological and economic conditions that form and are formed by materials is needed. As Hartwick argues that a geo-materialist linking of consumers and producers has the potential to stimulate political praxis for the discipline of geography (2000), the same may be said for design. The strategies of the food justice movement are an important precedent in this regard. The movement's insistence and visualization of the linkages between land use, ecological dynamics and social justice has brought the question of where food comes from into daily parlance. The most successful tactics are spatial experiments that challenge normative scales and models of production and propose models of cooperative and sponsored labour. While the construction materials industries are vastly different from agriculture, the very examination of how they work is critical to understanding design today. Greater fluency about the expanded relations of landscape making is necessary to imagine material practice as one that could enact solidarities with workers, other species and landscapes 'elsewhere'.

Acknowledgements

Thanks to Anne Weber and Adrian Blackwell for their many contributions to this research. I would also like to thank the editors of JoLA and the anonymous reviewers of this paper for their insightful and constructive comments.

Notes

1 For a comprehensive account of material flow in relation to processes of urbanization, see P. Baccini and P. Brunner, *Metabolism of the Anthroposphere: Analysis, Evaluation, Design* (Cambridge, MA: MIT Press, 2012), p. 392.

2 The exchange of the commodity in the open market occludes the social relations of production (between worker and consumer), see chapter 1 of K. Marx, *Capital: Critique of Political Economy* (1867).

3 For example, see M. Mostafavi and D. Leatherbarrow, *On Weathering: The Life of Buildings in Time* (Cambridge: MIT Press, 1993) and N. Kirkwood, *Weathering and Durability in Landscape Architecture: Fundamentals, Practices, and Case Studies* (Hoboken, NJ: John Wiley, 2004).

4 For example, see N. Dunnett and J. Hitchmough, *The Dynamic Landscape: Design, Ecology and Management of Naturalistic Urban Planting* (London: Taylor & Francis, 2008) and L. Margolis and A. Robinson, *Living Systems: Innovative Materials and Technologies for Landscape Architecture* (Basel: Birkhäuser, 2007).

5 For a thorough account of the impacts and issues associated with materials in landscape architecture and evaluation systems, see M. Calkins, *Materials for Sustainable Sites: A Complete Guide to the Evaluation, Selection, and Use of Sustainable Construction Materials* (Hoboken, NJ: Wiley, 2009). For more information on the Sustainable Sites Initiative, see M. Calkins, *The Sustainable Sites Handbook* (Hoboken, NJ: Wiley, 2012).

6 The Rainforests of New York campaign was initiated in 1995 by members of Rainforest Relief and New York Climate Action. See www.rfny.org, accessed 15 January 2013. For a video of the High Line action, see www.youtube.com/watch?v=CsRfrmLW8AU, accessed 15 January 2013.

7 See for example K. Hill, 'Shifting Sites', in C. Burns and A. Kahn (eds.), *Site Matters* (New York: Routledge, 2005); P. Belanger (2007), 'Landscapes of Disassembly', *Topos* 60: 83–91; and N. Lister, 'Ecological Design', in R. Cote, J. Tansey and A. Dale (eds.), *Linking Industry and Ecology: A Question of Design* (Vancouver: University of British Columbia Press, 2006).

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