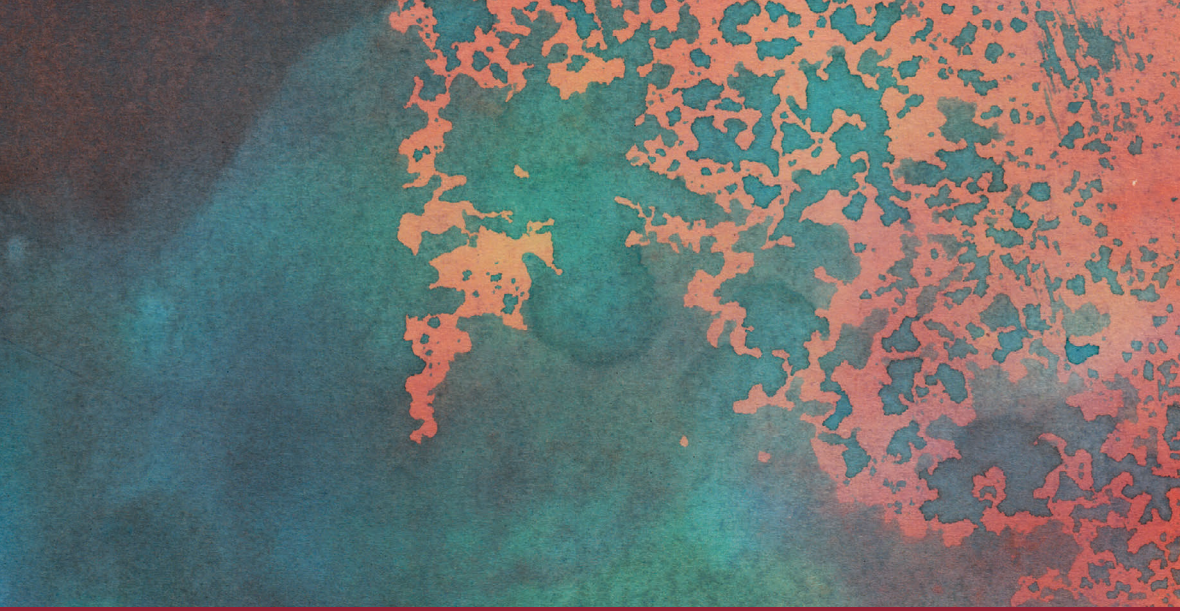
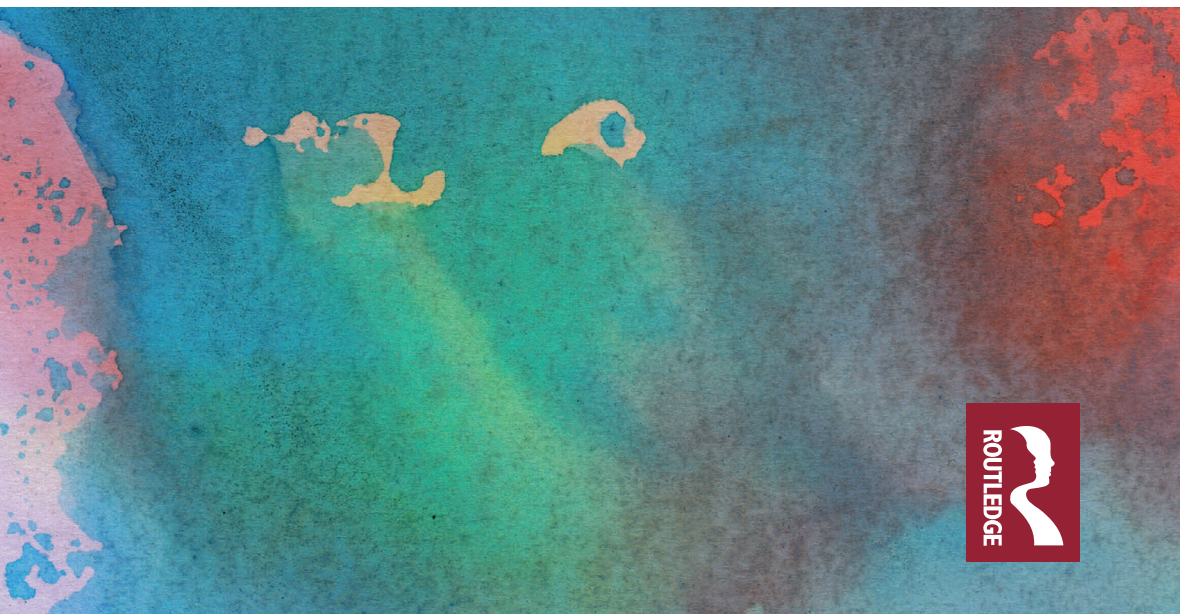


Routledge Equity, Justice and the Sustainable City

URBAN ECOSYSTEM JUSTICE

STRATEGIES FOR EQUITABLE SUSTAINABILITY AND ECOLOGICAL LITERACY IN THE CITY

Scott Kellogg



ROUTLEDGE

Urban Ecosystem Justice

Merging together the fields of urban ecology, environmental justice, and urban environmental education, *Urban Ecosystem Justice* promotes building fair, accessible, and mutually beneficial relationships between citizens and the soils, water, atmospheres, and biodiversity in their cities.

This book provides a framework for recentering issues of justice and fairness in sustainability discourse while challenging the profound ecological alienation experienced by urban residents. While the urban sustainability movement has had many successes in the past few decades, there remain areas for it to grow. For one, the benefits of sustainability have disproportionately benefited wealthier city residents, with concerns over equity, justice, and social sustainability frequently taking a back seat to economic and environmental considerations. Additionally, many city dwellers remain estranged from and unfamiliar with ecological processes, with urban environments often thought of as existing outside of nature or as hopelessly degraded. Through a citizen-centered lens, the book offers a guide to reconciling these issues by demonstrating how questions of equity, access, and justice apply to the biophysical dimensions of the urban ecosystem: soil, water, air, waste, and biodiversity. Drawing heavily from the fields of urban ecology, environmental justice, and ecological design, this book lays out a science of cities for people: a pedagogical platform that can be used to promote ecological literacy in underrepresented urban communities through affordable and decentralized means.

This book provides both a theoretical and practical field guide to students and researchers of urban sustainability, city planners, architects, policymakers, and activists wishing to develop reciprocal relationships with urban ecologies.

Scott Kellogg has been Educational Director of the Radix Ecological Sustainability Center, an urban environmental education and just sustainabilities advocacy nonprofit based in Albany, New York, since 2009. Prior to Radix, Scott was a cofounder and collective member of the Rhizome Collective in Austin, Texas, an urban sustainability and activist center which functioned from 2000 to 2009. Scott has a PhD in Science and Technology Studies from Rennselaer Polytechnic Institute, a master's degree in Environmental Science and Policy from Johns Hopkins, and a bachelor's degree in Humanities from the New College of California. He teaches in a number of graduate and undergraduate programs in universities throughout the Northeast, including Bard College's Masters in Environmental Education program. Scott is the coauthor of *Toolbox for Sustainable City Living: A Do-It-Ourselves Guide* (2008).

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Urban Ecosystem Justice

Strategies for Equitable Sustainability and Ecological Literacy in the City

Scott Kellogg

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Author's prologue: sustainability – the new opioid of the masses

Since the beginning of the new millennium I have built a professional career in the field of urban sustainability. While consisting in part of consultation, writing, lecturing, and policy work, the bulk of it has been in the nonprofit sector, designing, managing, and operating urban sustainability demonstration and education sites. These have been the Rhizome Collective in Austin, Texas, which functioned from 2000 to 2009 and the Radix Ecological Sustainability Center in Albany, New York, which began in 2009 and continues to operate to the present day. During this time, the shape, purpose, and central players of urban sustainability have changed enormously, evolving from a radical fringe movement rife with transformative potential to a thoroughly mainstream, co-opted, misapplied, and potentially dangerous concept. This book is the outgrowth of these years of experience and research and an effort to grapple with the current state and future direction of the urban sustainability concept.

My personal path from early environmental consciousness to the formation of the Rhizome Collective has been one of change and transformation, as well. While I was in high school, I considered myself to be an "environmentalist", concerned with the most prominent environmental issues of the time including rainforest destruction, ozone depletion, acid rain, toxic waste, the greenhouse effect, and so on. These "post-Earth Day" causes popular in the late 1980s and early 1990s took place before sustainability discourse became widespread and reinforced a modernistic notion that humans were an inherently destructive species separate from nature and destined to ruin the planet. The message internalized was that the best an environmentalist could hope to do would to be less of a human: conserve resources, be a vegetarian, recycle, consume less, avoid procreation, feel guilty about one's own existence, etc. Taken to its logical conclusion, this mindset would argue that it would be best for humanity to commit speciecide in order to save the earth. Seldom, if ever, discussed were ways in which it would be possible for humans to live in a relative, if only discordant, harmony with the global ecosystem.[1] We remained ignorant of the many examples of human societies doing so outside of the trajectory of Indo-European agriculturalists-turned-dominant Western culture with which we were familiar (Balée, 2002).

These attitudes were strongly reinforced for me at a Model UN Conference I attended in eleventh grade at the United Nations where a speaker discussed

rainforest conservation in the Amazon Basin and the need to create protected preserves free of human activity (including indigenous peoples). Years later (in my PhD program) I read a piece by Donna Haraway where she deftly dissects this standpoint, describing it as an "Eden under glass" (Jamison, 1992). At some point in my early undergraduate years as my personal political beliefs became more radical, I became disenchanted with the environmental movement, seeing it as a weak liberal cause that did little to significantly challenge the capitalistic forces responsible for ecological destruction and social injustice. I became more involved with decentralized nonviolent anarchist "social" campaigns such as Food Not Bombs, Homes Not Jails, and political prisoner campaigns. Involvement with these radical movements helped me to develop a solid critique of capitalist society, one that has remained central, albeit less pronounced, in my work to this day.

I remained involved in radical causes throughout my post-undergraduate years, culminating in the then-nascent global justice movement's massive demonstrations against entities such as the IMF, WTO, the World Bank, and the US Republican party. While initially exhilarating, these rallies ultimately led to me suffering from a degree of activist burnout – multiple arrests as well as the effects of low-intensity psychological warfare methods employed by police necessitated that I changed my personal tactics for achieving social transformation. The alter-globalization movement had a clear stance and well-developed critique against global capitalism but offered little in the way of solutions. I began to ponder the meaning of the movement's rallying cry "another world is possible": How do people eat in this other world? How do they procure water, energy, and deal with their wastes? How are the roles and responsibilities typically carried out by governmental agencies such as education, health care, transportation, and decision-making fulfilled by community organizations? Is it possible to plant the seed of this alternative world while simultaneously taking a hatchet to the dominant systems which we opposed?

Pondering these questions sent me on a quest to find their answers that led me to the permaculture movement. Permaculture (a portmanteau of "permanent" and "agriculture" and "culture") is a design philosophy that strives to create regenerative human–ecological relationships in areas including (but not limited to) food, water, waste, building, energy, and social systems. While drawing primarily from the ecological sciences, permaculture also borrows concepts from traditional ecological knowledge, agronomy, landscape design, architecture, and a variety of other disciplines, giving students a practical skill set of tools and technologies for building sustainable infrastructures (Lockyer, 2013). While not explicitly politically aligned in one sense or another, permaculture's open source and decentralized structure made it highly compatible with the radical anarchistic philosophies I held at the time. In this sense, permaculture provided the philosophical and pragmatic counterbalance to my activism-informed social criticism that I had been seeking – for every "no" I previously had, I now had a "yes". Being able to point to positive, functioning alternatives lent considerable strength and validity to my critique.

While having enormous potential as both a design philosophy and a worldview, the permaculture movement was not without its shortcomings. Foremost among

them is the fact that permaculture was created primarily for extensive rural and land-based applications. While employed by many working farmers in the Global South, based on my observations most of permaculture's adherents in the Global North were white, middle class, and landowning. While there was some discussion of urban applications, most of the material in a standard permaculture curriculum had little relevance to city dwellers and even less to low-income urban renters. Furthermore, I saw permaculture's political ambiguity as a potential weakness of the movement (while mostly dominated by leftists, there was a troubling right-leaning libertarian element at play as well).

In response to these critiques, I sought to synthesize an urban-based permaculture with anarchist politics, developing a concept I named "radical sustainability". This was also a reaction to the growing neoliberalization of sustainability (most notably in the form of "sustainable development") and to corporate greenwashing in general (Swyngedouw, 2010). With radical sustainability in mind, myself and a handful of other like-minded activists cofounded the Rhizome Collective in Austin, Texas. Rhizome consisted of a nearly 10,000 square foot warehouse that functioned both as an urban sustainability demonstration site and as a center for community organizing, providing space to various activist organizations including Food Not Bombs, Bikes Across Borders, the Independent Media Center, and Inside Books (a books-for-prisoners operation). Interspersed among these organizations' workspaces were gardens, constructed wetlands, wind turbines, chickens, parabolic solar cookers, rain barrels, aquaponics fish farms, and composting toilets. Intended to be simple, affordable, and made of repurposed components, the placement and respective ebbs and flows of these systems were strategically aligned, guided by permaculture design principles (Holmgren, 2002).

By housing these disparate components in common space, we hoped to create a vital cross-pollination of people, ideas, and interests, tangibly demonstrating the necessary interconnectedness of social and ecological justice issues (and therein challenging a persistent meme in many activist circles that maintains these as separate). For us, "rhizome" was both a literal botanical term and a metaphor. Inspired by the Deleuzian/Guattarian concept of rhizomatic organization (Deleuze, 2004), we saw ourselves as being one autonomous chapter that was linked to others at the root level through an interconnected network. Just like the running bamboo that was spread around the space's periphery, our movement was also hidden underground, tenacious, and difficult to uproot.

The Rhizome Collective lasted from 2000 to 2009, in that time evolving from a burned-out dilapidated shell of a warehouse inhabited by circus punks to a reasonably well-functioning consensus-run collective, operating a thriving community space and receiving federal grant funding. Rhizome's peak likely occurred in 2004 with the acquisition of a ten-acre brownfield parcel and subsequent receipt of an EPA Brownfields Cleanup Award. The property, located on the edge of Austin city limits, had been previously used for several decades as an illegal dumping site and was covered in a literal mountain of debris. Aware of how much it would cost to clean the site, its owner was eager to donate it to a nonprofit and at least receive a tax write-off. Upon learning of the property, we simultaneously applied for and

received a $200,000 EPA grant to clean the site and transform it into an urban sustainability education park. Over the next two years we set about the cleanup, paying ourselves to carefully remove and separate out every piece of garbage, sorting them according to their reuse or recyclability potential. State and federal authorities were stunned when we finished the project on schedule and received a certificate of completion, amazed that we were able to complete the cleanup with such limited funding and scant resources. It was likely our nimbleness, resourcefulness, motivation, and lack of extensive overhead costs that allowed us to succeed where larger organizations failed.[2]

Perhaps, the most interesting aspect of the entire project to me was our attendance of two annual national EPA-sponsored brownfield conferences in Denver and Boston. Expecting to find other small nonprofits such as ours working on similar endeavors, I instead found representatives of an apparently large and growing industry related to the acquisition, cleanup, and subsequent redevelopment of blighted urban properties. Comprising a coalition of government officials, massive engineering firms, and real estate interests, it became obvious to me that government brownfield programs primarily served to redirect federal dollars into these private corporations, who no doubt in turn created a powerful lobby. A handful of small nonprofits such as ours were given funding to create the appearance that issues of social sustainability were taken into consideration. At these conferences there was virtually no discussion about the social justice components or potential negative repercussions of brownfields development, such as creating local employment or the risk of gentrification. That was perhaps my first exposure to a style of depoliticized technocratic sustainability governance that I've since encountered many times and that in many ways has come to dominate much of sustainability discourse.

In the time between the creation of Rhizome and today, the character and extent of urban sustainability, along with its associated discourses, have changed considerably. What was a radical idea in 2000 has since become commonplace, with the idea of "sustainable cities" now having largely been embraced by urban planners, corporations, and the mainstream media (Swyngedouw, 2010). When Rhizome began, it seemed to me (perhaps naively) that merely planting a garden in the city was a radical act. By 2008, it was obvious that it was no longer the case. Sensing that urban sustainability was in danger of being co-opted, Rhizome cofounder Stacy Pettigrew and I wrote the book, *Toolbox for Sustainable City Living: A Do-It-Ourselves Guide* (Kellogg, 2008). The book was an attempt not only to document the previous years' work at Rhizome but also to securely situate urban sustainability (or at least aspects of it) within a radical political platform. It was here that we detailed the notion of "radical sustainability" and made explicit references to its use in "dual-power anarchist strategies". Furthermore, the book extensively critiqued "green capitalism" and warned of the potential for sustainability endeavors to result in the gentrification of low-income communities. Being one of the first books of its kind on a topic of growing popularity, "Toolbox" was well received and sold vigorously. Within a year of its publication, however, a flurry of other similarly themed "urban homesteading" books were released.

In general, they were apolitical, slickly produced, and no doubt appealed to a wider commercial audience. Urban sustainability had gone mainstream, and "Toolbox" was quickly relegated to radical fringes. Immediately, I witnessed a backlash from "post-politically" minded sustainability advocates. At one book publicity event in Phoenix, Arizona, I was instructed by the organizer to avoid bringing up any politically controversial topics and to only focus on "gee-whiz" type positive solutions (I proceeded to anyway, much to their chagrin). I saw a dangerous potential for sustainability to become an opioid of the masses. Promising simple solutions – pretty gardens, solar panels, bicycle transportation, and rain barrels – people were distracted, feeling as if they were making a difference all the while the capitalist machine churned onwards. Permaculture, if not continually engaged with critical issues of equity, justice, and access, risked being reduced to a chic gardening fad of the middle class.

Rhizome ultimately fell victim to the pressures of urban growth that we were unintentionally complicit in fueling. In 2009, an internal policy change in Austin's City Code enforcement department triggered building inspectors to target spaces such as ours that informally hosted arts, music, or community activism. Spaces such as these were apparently seen as undesirable to the new incoming occupants of the high-end residential complexes now being built across the city's historically Latino East Side. Even the industrially zoned neighborhoods where Rhizome was located were subject to crackdowns. This process of displacement and gentrification had been underway for some time, however, and was to at least some degree exacerbated by the presence of "bohemian" operations such as Rhizome. Despite being outspoken against the rapid increase in property values and allying with anti-gentrification causes, we ultimately succumbed to the enormous economic pressure put on our community, a consequence of Austin's incredible growth rate over the 2000–2010 decade. In March 2009, we were subject to a building inspection that resulted in extensive code violations that would have been impossibly expensive to remedy. Somewhat ironically, many of the innovative sustainability features at Rhizome that had won us widespread acclaim from the city were considered among the most egregious violations. Facing extensive penalties, I was left with no choice but to sell the building that housed the Rhizome Collective.

On the heels of the destruction of Rhizome, I moved with my wife and two daughters to Albany, New York, to begin again. Albany and Austin are two very different cities. Apart from both being capital cities that begin with the letter "A", they have very little in common in terms of climate, history, culture, politics, population, economic processes, social dynamics, or otherwise. While Austin is a young, rapidly growing (sprawling) typical sunbelt city that celebrates its "weirdness", Albany is an old shrinking post-industrial "rust belt" town with entrenched politicians, cold winters, and in further contrast to Austin, celebrates being "boring". While moving to Albany may have seemed like an unlikely choice, there were reasons why it was chosen over other places – as both my wife and I had family in the region, we had been spending summers in Albany for several years already. In "shrinking cities" (a phenomenon I discuss later in this book), there are opportunities to address both affordable housing and food security issues

simultaneously. Unlike in fast-growing cities where every square foot of space is contested, the abundance of housing stock and vacant property in shrinking cities makes it possible to have both affordable homes and urban agriculture. Furthermore, the challenge of repurposing old industrial infrastructure for sustainable uses is a monumental and fascinating challenge that must be carried out throughout the world in cities like Albany.

With these considerations in mind, we conceived the idea of the Radix Ecological Sustainability Center. Radix (the Latin word for "root") clearly had many parallels with Rhizome in both its name and purpose; however, there would be key differences. With Rhizome, I commonly felt that I was spread too thin by managing its many moving parts and was never successful in developing serious environmental educational programming for youth (the freaky post-apocalyptic aesthetic of Rhizome certainly did not help parents or teachers to feel comfortable in bringing their children there, either). With Radix, I wanted to focus on being an environmental education center that existed primarily to serve inner-city children and youths, building meaningful and long-lasting relationships with area public schools. Building this level of community trust would not be an easy process, but I felt compelled to begin.

From 2009 to the present day, I have been working as the educational director of the Radix Center. I have been successful at creating a functioning urban environmental education center consisting of a one-acre farm containing a solar greenhouse, microlivestock, aquaponics, bees, gardens, perennial food forest, composting operation, and more. We receive numerous visitations each year from groups ranging from elementary school age children to university students. With each group, I try to increase their ecological literacy and demonstrate how green and agricultural spaces function when integrated into a high-density urban mosaic.

Since the publication of "Toolbox" and the beginning of Radix, I have been trying to push the boundaries of what is commonly regarded as pertinent to urban sustainability: both in being more explicit regarding issues of equity and justice and in "going beyond the backyard". A serious inherent limitation in the idea of "urban homesteading" is that it makes sustainability primarily about the individual. The allusion to "homesteading" alone conjures sentimental images of the rugged frontiersman, self-reliant and self-sufficient. In many ways, self-sufficiency is antithetical with urban living: urban residents, historically, are specialists as opposed to generalists and can rely on the skills and expertise of their neighbors through barter and exchange. In many ways, the greatest perk and asset of living in a city is the freedom to not have to be a jack-of-all-trades but rather to become particularly proficient in one area. In truth, I am only so critical as I am fully in support of urban residents in being more self-reliant, however, I would encourage them to recognize the importance of social interconnectivity and the potential of collective information exchange within an urban system.

I was additionally interested in looking at urban ecological systems beyond the level of the individual homestead, backyard, lot, garden, etc. What was the synergistic effect of all these spaces interacting with each other? What could we say about creating mutually reciprocal relationships with urban waterways, soils, and

atmospheres that cut across and beyond the level of the individual sustainability site? What were our interactions like with the non-human living systems within a city that we were not directly cultivating? How much of a barrier do toxic industrial legacies create to furthering these relationships? Could we look at urban permaculture on a whole systems scale "beyond the backyard"?[3]

Asking these questions led me quickly to the discipline of urban ecology, a field that was and is almost entirely studied from a top-down perspective and is made up of primarily by experts in the fields of urban planning and design. I began to wonder if the insights of this discipline had potential to be used by citizen sustainability activists; could obscure ideas such as urban metabolisms (Girardet, 1992), patch dynamics (Alberti, 2005), airsheds (Kirstine), anthrosols (Smith, 1980), novel ecosystems (Robbins, 2014), synanthropic species (Rodewald, 2008), and reconciliation ecology (Rosenzweig, 2003) be appropriated to be part of their toolkit? Furthermore, I wanted to apply questions of social justice, access, and equity to the urban ecosystem concepts that are seldom more than superficially considered in professional circles. Who has access to the rivers that flow through cities and what barriers stand between them? Which populations are most disproportionately exposed to soilborne toxins, and can they proactively work to reduce them? How do we, as citizens, think about our urban atmospheres? Similar questions have been raised numerous times by the environmental justice movement but most commonly from a "reactive" standpoint. Could we have respectful, loving, nurturing (if not imperfect) relationships with the various dimensions of the urban ecosystem? If possible, could ecosystem justice's critical analysis be combined with the ethos of urban homesteading to create mutually reciprocal symbioses between the human residents of a city and the rivers, skies, soils, birds, mammals, bugs, plants, and microbes cohabitating and cocreating them with us?

It is with these fundamental questions that I began my PhD program, the research for my dissertation, and now this book, coining the term "urban ecosystem justice" for use as an overarching framework. The privilege of being a graduate student had given me the space and access to extensive and disparate bodies of literature related to these themes. Much of my work and research has been an attempt at synthesis, combining the critique of one discipline with the insights of another. Many researchers approach the topic of urban ecosystem justice peripherally yet are not explicitly in dialogue with one another. This is most starkly noticeable in the separation between the social and natural sciences, a long-standing division that both confounds and frustrates me. In addition to the aforementioned areas of urban ecology, urban design, and environmental justice, I have also drawn significantly from the fields of political ecology, geography, critical urban theory, historical ecology, science and technology studies, and socio-ecological systems theory. Each discipline offers unique insights that help to create a fuller, more complex picture of the topic.

One important realization I've come to in my research, however, is that it's not necessary, realistic, or appropriate for me to try to develop any sort of "unifying theory of cities". Cities are inherently complex, dynamic, and constantly adapting environments made up of a plurality of moving parts and stories.

To quote Timothy Morton, "Places contain multitudes", the whole of a city is less than the sum of its parts (Morton, 2016). In this sense, Morton implies that cities are almost *anti*-emergent phenomena! From a distance, they may appear to be a monolithic whole, but once you zoom in, you realize that there are infinitely more dimensions to them at the micro level – larger on the inside than on the outside. I feel liberated in not having to understand, describe, and reduce all their processes into a single set of ideas or equations. In this sense, approaches to just urban transitions require a necessary diversity and plurality of approaches – decentralized and horizontally distributed. Sustainabilities are situated and contextualized, sharing common aspects yet uniquely tailored to the micro-political conditions of the point of their implementation (Sze, 2018).

It is with this history and these experiences that I present this book. It is my wish that it may serve as a toolbox of concepts and practical skills useful to the activist-scholar working for just sustainabilities and ecological equities and that it may further the goal of transferring knowledge from the confines of the ivory tower to the intellectual commons.

Notes

1 Botkin, Daniel B. *The moon in the nautilus shell: Discordant harmonies reconsidered*. Oxford, UK: Oxford University Press, 2012.
2 See Proctor, Rachel. *Showing rhizome the money*, May, Friday, December 17, 2004. www.austinchronicle.com/news/2004-12-17/243200/

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Introduction

As the majority of humans on the earth now live in urban environments, it could be argued that the battle for a sustainable world could be fought and won primarily within cities. Cultural leverage points, economic engines, centers of innovation, and home to millions, how these complex adaptive socio-ecological urban entities unfold will have profound impacts on the rest of the planet. Will cities become centers of progressive ideals of justice and equity where residents coexist in relative harmony with the non-human world, or will they become monstrous toxin-producing resource vacuums with entrenched and chasmic disparities between the haves and have-nots? These are critical questions, and the field of urban sustainability has been developed to inform the responses. This discipline has undergone both considerable growth and change over the past few decades. Once regarded as a radical fringe topic (albeit with revolutionary potential), the idea of sustainable cities has now become quite mainstream, with numerous books and journals dedicated to its study. Inasmuch as the concept has been increasingly co-opted by corporate and neoliberal interests, it is often reduced to a marketing buzzword. More insidiously, though, sustainability discourse is now used to create a greenish veneer to an emerging form of enviro-technocratic governance that provides premium environmental services to wealthy residents while relegating the poor to ecological sacrifice zones on the city's toxic periphery (Swyngedouw, 2009). This divide has the ill effect of instilling a sense of separateness from and fear of the non-human among the urban populace, further widening the false duality of nature and society. With pressures from persistent inequality, climate change, energy depletion, and biosphere degradation continuing to mount (Steffen, 2015), the imperative to initiate urgent just urban transformations grows greater.

It is here that urban sustainability is at a crossroads – can it be reclaimed by citizen-centered and grassroots organizations for the purpose of building genuinely just and healthy communities, or has urban sustainability become nothing more than another "opiate of the masses" to keep us distracted while neoliberal business-as-usual carries on? To inform this discussion, it is necessary to analyze what I believe to be two of the primary challenges that the urban sustainability movement now faces. These are what I refer to respectively as "social-sustainability exclusion" and "ecological alienation".

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Social sustainability exclusion

Sustainability discourse over recent years has placed a disproportionate emphasis on the "environmental" and "economic" aspects of sustainability, largely ignoring or underemphasizing sustainability's social dimension (Agyeman, 2002). This trend has produced a form of techno-managerial sustainability or "post-politics" (Swyngedouw, 2010) that is attractive to business owners, policymakers, and the ruling classes as it promotes a "green" agenda that is at once friendly to capital and conducive to crafting the illusion of community consensus. By relegating the social component to the sidelines, inconvenient questions regarding equity, access, fairness, race, and class are glossed over, and fundamental structural socioeconomic inequalities are never addressed. As such, the status quo remains unchallenged and environmental initiatives privilege only affluent communities. Little or no attempt is made to ensure that there is equitable distribution of environmental harms and goods, and in cases when environmental amenities are provided to low-income communities, it often results in the unintentional (or intentional?) consequence of their displacement/cultural alienation (i.e., gentrification) (Gould, 2016). The most extreme form in which this manifests is the phenomenon of "urban ecological securitization" (Hodson, 2009), where premium environmental services are provided to the wealthy and the poor are displaced to the urban edges where they are subject to the brunt of ecological risk, exposure, and vulnerability. More recently, extreme visions for such techno-ecological authoritarian regimes have manifested under the name of "ecomodernism" (Asafu-Adjaye, 2015) that would propose that humans live entirely segregated from nature in self-contained urban spheres.

Ecological alienation

Ecological alienation or ecological rift (McClintock, 2010) is a present-day manifestation of the nature–society dualism professed through modernist ideals and philosophy (Descola, 1996). Through it, urban residents are profoundly separated from and ignorant of the natural processes and systems that make life on the earth possible (i.e., food production, water, composting/decomposition, energy, atmospheric/climatic processes, non-human life). The separation of town and country has relegated these processes and systems to the urban periphery or hinterlands, making them invisible and inaccessible to urban residents (Elmqvist, 2013). In instances where "remnant" ecologies remain in cities, they are commonly made inaccessible through enclosure, poisoned, degraded, or otherwise devalued. It has only been in the past few decades that the discipline of urban ecology itself has embraced the role that human and social processes play in urban ecosystem functioning, prompting a shift in emphasis from the "ecology in" to the "ecology of" cities (Pickett, 2016). Where environmental education does exist in cities, it teaches about the environment and nature as external to the city, with urban environments being considered unworthy of study (Thomashow, 2015). Likewise, definitions of "the environment" seldom are extended to include social and

human processes. The combined influence of these conditions produces in both children and adults what is referred to as "ecophobia", or fear of ecological systems and processes (Sobel, 1996). When a citizenry has no sense of interrelation, love, concern, or responsibility for ecological systems, they cannot be expected to act in their defense.

Synthesis and solution: urban ecosystem justice

Urban ecosystem justice is an attempt to reconcile these two problems, and inasmuch as it hopes to redirect the energy and intent of the urban sustainability movement toward more progressive and regenerative ends. In framing cities as complex, adaptive socio-ecological systems that are the coevolutionary products of both human and non-human processes (Alberti, 2008), urban ecosystem justice looks at how questions of equity, access, fairness, race, and class apply to the biophysical dimensions of urban ecosystems (soil, water, waste, air, biodiversity). By doing so, it makes explicit and moves social sustainability to the forefront of sustainability discourse, while simultaneously challenging ecological alienation by making the urban ecosystem a legitimate, and relevant topic of study. Very importantly, urban ecosystem justice situates itself within a citizen-centered, grassroots context (Smith, 2016). In this regard, it serves as a pedagogical tool kit focused on exploring and creating mutually reciprocal symbioses between ordinary citizens and urban ecologies from the ground up, an angle typically not explored from top-down planning and policy perspectives. By applying a DIY ethic to the "ecology of cities" paradigm developed in the discipline of urban ecology (Pickett, 2016), humans are central and integral to urban environmental processes. In this regard, urban ecosystem justice can be thought of a "science of cities" for the people (McPhearson, 2016).

This book is divided into three main parts. The first part consists of a thorough analysis of the questions of ecological alienation and equity exclusion, largely based around an examination of related concepts and their reconciliatory potential. Collectively, these concepts form a "chaotic bricolage" that comprise the urban ecosystem justice mosaic. This first part is heavily theoretical and functions to unpack key concepts and analyze how they fit within and contribute to a larger urban ecosystem justice framework. The second part is an in-depth exploration of urban ecosystem justice itself in both its theoretical and practical components, divided into sections pertaining to the various biophysical "spheres" of the urban ecosystem: soil, water, waste (compost), atmospheres, and biodiversity. The second part is less theoretical than the first and delves into more applied, grounded applications and discussions of the nuts and bolts of urban ecosystem justice. The third part is a study in applied urban ecosystem justice told in the story of the Radix Ecological Sustainability Center and its educational philosophy. I hope the reader will be able to draw equally upon all parts of the text.

This book, particularly in Part II, places a strong emphasis on the practical application of this knowledge, containing a number of "how-to" sections that provide a step-by-step instruction on how to construct and implement the learning

tools and systems described. While this format may be atypical for an academic work, I believe it provides a critical bridge between the realms of theory and practice and will hopefully be of great use to the scholar-activist engaged in the fields of urban environmental education, ecological design, environmental justice advocacy, and all manner of "situated solidarities" (Routledge, 2015). Like the false dichotomy of nature and society, the mythological divide between activist and scholar is similarly damaging – too often academics will theorize and postulate on topics which they have no direct, engaged, embodied, and visceral relationship with. I have regularly observed that many professional scholars understand ecological concepts on an intellectual level yet lack primary, dirty-handed, intimate familiarity with their subjects. This can be remedied through activities like gardening and composting that are grounding, both literally and metaphorically. This firsthand awareness and mutualism with the non-human world is a salve to the mental fatigue theoreticians must otherwise endure. Furthermore, inclusion and collaboration with nonacademic communities give access to an expert knowledge not available within the confines of the ivory tower. Likewise, many sustainability activists would benefit from an expanded theoretical analysis, a luxury that the demands of advocacy work rarely permit. It is my sincere wish that, through this, the knowledge, insights, and skills of the academy be made broadly accessible to those outside of its often impermeable boundaries.

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