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Angaben zur Veröffentlichung / Publication details:

Acosta, Raúl, Joseph Adeniran Adedeji, Maan Barua, Matthew Gandy, L. Sasha Gora, and Kara Murphy Schlichting. 2023. "Thinking with urban natures." *Global Environment* 16 (2): 177–21. https://doi.org/10.3197/ge.2023.160202.

Thinking With Urban Natures

Raúl Acosta, Joseph Adeniran Adedeji, Maan Barua, Matthew Gandy, L. Sasha Gora and Kara Murphy Schlichting

abstract

Since the Enlightenment, cities have been considered as exemplary spaces of human achievement. Technological developments and the constant reorganisation of materials and infrastructures have contributed to a widely shared conception of nature as something outside of urban areas. Our age, framed by the Anthropocene and the sixth wave of extinction, has shattered such vision. Novel reflections across the natural sciences, the arts and the humanities have chosen to focus on relational entanglements instead of separating the city from the environment. In this short collection, we offer a series of reflections about multiple urban natures that often remain unknown or concealed. Each of us does so from a unique disciplinary perspective, ranging from anthropology to history and geography over urban ecology, urban studies and landscape architecture. We hope to point towards a multidisciplinary articulation of urban nature as in itself diverse, complex and de-centred.

keywords: *City, Anthropocene, Urban ecology, Architecture, Multispecies*

Raúl Acosta

For thousands of years, humankind has congregated in cities, turning them into key human settlements. As sites of convergence, cities concentrate difference and multiplicity – in people, ideas and objects. Urban life has been mostly interpreted – in practice and in theory – as a human endeavour. While some scholarly approaches have already considered cities as inclusive of other life forms, only in recent decades have the complex collections of other-than-humans crammed among buildings, goods, open spaces and vehicles gained wider recognition as unique ecosystems. The increased attention to cities as habitats not limited to humans is partly due to our current historical moment: the twenty-first century is known as the century of urbanisation at a time of environmental crisis. In this context, we originally set out to reflect on various unknown facets of urban natures, on features that may appear self-evident but are often overlooked. This text is thus a provocation to spur a dialogue. We decided to frame our collective effort by engaging with a multiplicity of

urban natures that make up city life. It has long been acknowledged that the style of urban nature that city planners and governments most often promote is somewhat reductive.[1] We do not seek to enter such a debate but rather add a series of contributions to help think with the multiplicity of urban natures and imagine the city anew. This introduction thus offers a frame for our individual approaches informed by our contrasting academic disciplines and opinions. A number of theories accompany this discussion.

First and foremost, it is relevant to address the polysemy of 'nature' as a concept.[2] The emphasis here is on its meaning as encompassing the biophysical material world around us not as a static aggregation of things but as a concatenation of ecological relations between life forms, matter, landscapes and dynamic processes like weather events, magnetic forces or geological movements. In this sense, nature is the haphazard – yet patterned – collection of things and processes that change over time. As a concept, nature also widely indicates an object's essential qualities or a being's innate disposition. It serves as a reminder of how intrinsic its symbolism is to what lies at the root of everything around and inside us. Notice how plants, landscapes and our material world underpin the metaphors we use.[3] But perhaps more significantly, nature has been ingrained in modern discussions as all that is pure against what is human-made.[4] It is common to set nature in dichotomic relation against 'culture' or 'nurture' and thus foreground the fundamental building blocks of the industrialised world.[5] This originates in the Cartesian

[1] A. Davidson and B. Ridder, 'Turbulent times for urban nature: Conserving and re-inventing nature in Australian cities', *Australian Zoologist* **33** (3) (2006): 306–314.

[2] R. Williams, 'Nature', in *Keywords: A Vocabulary of Culture and Society*, rev. ed. (1976; repr., New York: Oxford University Press, 1985), pp. 219–224.

[3] G. Lakoff and M. Johnson, *Metaphors We Live By* (1980; Cambridge, MA: Harvard University Press, 2003).

[4] W. Cronon, 'The trouble with wilderness: Or, getting back to the wrong nature', *Environmental History* **1** (1) (1996): 7–28.

[5] V.I. Monfrinotti Lescura, 'The ontological background of Western modernity: A critical review of nature/ culture dualism', *En-Claves del Pensamiento* **30** (2021): e422. https://doi.org/10.46530/ecdp.v0i30.422.

mind-body dualism that established the premise for the elevation of thought over our biological selves. Thus, the stage was set for Enlightenment ideas and investigation to serve the Industrial Revolution to conquer nature.

For urban centres, which preceded such discussions by thousands of years, this Enlightenment notion of nature resulted in their reinterpretation through the prism of human achievement. The idea that nature could be tamed entered the metropolitan imagination in the form of recreational spaces (parks and gardens) or in decorative forms (trees along promenades, flowers in corner gardens, fish in fountains). Infrastructures to deal with vital elements – like drinking water and sewage – followed advances put forth with ideas about hygiene and health. Motorised vehicles – either freestanding or on rails – replaced the reliance on animals for transport (mostly horses). The emerging models of urbanisation, strongly reliant on scientific and technical advancements, were exported from Europe and the United States – with a fair degree of violence and power inequalities – to the rest of the world. The result was a wide range of adaptations to local geographies, cultural contexts, historical circumstances and socioeconomic possibilities, which nonetheless share some basic elements of urban life. Something that has also travelled around the world is the idea that untamed nature is located outside cities, that it constitutes places to visit. These imaginaries have equally shaped how scientific research was carried out, emphasising studies of ecological relations outside cities and, when studying urban areas, focusing on ecosystems as if contained in bubbles within the built environment.

In recent decades, however, these views have changed.[6] Natural scientists have sidelined studies of ecosystems *within* cities in order to consider cities *as* ecosystems.[7] Similar to Bruno Latour's claims

[6] M. Gandy, 'Urban nature and the political imaginary', in N. Heynen, M. Kaika and E. Swyngedouw (eds), *In the Nature of Cities: Urban Political Ecology and the Politics of Urban Metabolism* (London: Routledge, 2006), pp. 78–89; R. Acosta, M. Aschenbrenner, E. Dürr and G. Winder, 'Re-imagining cities as ecosystems: Environmental subject formation in Auckland and Mexico City', *Urban Research and Practice* **15** (3) (2022): 350–365.

[7] N. Heynen, M. Kaika and E. Swyngedouw (eds), *In the Nature of Cities:*

that we have never been modern,[8] there have been numerous calls to abandon a dichotomic conception of nature, including calls for considering urban biocultural diversity.[9] This resulted in the notion that life and matter are entangled in urban space, shaping new configurations of interactions and interspecies conviviality and friction.[10] Apparently, a series of phenomena contributed to these recent interpretations: some species have been found to evolve particular traits to better adapt to urbanity.[11] Other species have increasingly moved into cities as their traditional ecosystems have dwindled due to human encroachment resulting from urbanisation or industrial farming.[12] Yet, other changes have followed alterations in climatic patterns, which have modified conditions that favour certain life forms over others.[13] It may also be the case, however, that the current interest in urban ecosystems has helped to identify such multi-layered processes that may have been occurring for a longer period.[14]

Urban Political Ecology and the Politics of Urban Metabolism (London: Routledge, 2005).

[8] B. Latour, *We Have Never Been Modern*, trans. C. Porter (Cambridge, MA: Harvard University Press, 1993).

[9] M.L. Cocks and C. Shackelton, *Urban Nature: Enriching Belonging, Wellbeing and Bioculture* (London: Routledge, 2020); B.H.M. Elands, K. Vierikko, E. Andersson, L.K. Fischer, P. Gonçalves, D. Haase, I. Kowarik, A.C. Luz, J. Niemelä, M. Santos-Reis, K.F. Wiersum, 'Biocultural diversity: A novel concept to assess human-nature interrelations, nature conservation and stewardship in cities', *Urban Forestry & Urban Greening* **40** (2019): 29–34; M. Buizer, B. Elands and K. Vierikko, 'Governing cities reflexively: The biocultural diversity concept as an alternative to ecosystem services', *Environmental Science & Policy* **62** (2016): 7–13.

[10] A. Rademacher and K. Sivaramakrishnan, *Ecologies of Urbanism in India: Metropolitan Civility and Sustainability* (Hong Kong: Hong Kong University Press, 2013).

[11] M.J. McDonnel and A.K. Hahs, 'Adaptation and adaptedness of organisms to urban environments', *Annual Review of Ecology, Evolution, and Systematics* **46** (1) (2015): 261–280.

[12] B. Stoetzer, 'Ruderal ecologies: Rethinking nature, migration, and the urban landscapes in Berlin', *Cultural Anthropology* **33** (2) (2018): 295–323.

[13] R.A. Francis and M.A. Chadwick, 'Urban invasions: Non-native and invasive species in cities', *Geography* **100** (3) (2015): 144–151.

[14] T. van Dooren and D.B. Rose, 'Storied-places in a multispecies city', *Humanimalia* **3** (2) (2012): 1–27.

There may be a risk, however, that only a minority of experts considers cities as sites *of* nature instead of sites *against* nature. Would this have repercussions? It could. If people do not consider urban centres to be in need of care, in the same way as other ecosystems are, the threats to their balance will increase as time goes by. In this sense, nature may be in the eye of the beholder. If urban dwellers, government officials and others do not consider cities as nature, any environmental harm reduction initiative will not apply to cities.

With an ever-higher proportion of humanity living in urban centres, attitudes towards cities are fundamental on various scales: at the planning or policy-making level, within local government or management and also at the individual level of dwelling and bodily experience. Our age, framed by the Anthropocene[15] and the sixth mass extinction,[16] has spurred fresh critical perspectives on the human endeavour across the arts,[17] humanities,[18] activism and media. One of our fundamental challenges is thus to be able to think with complex ideas that entail a variety of possibilities and potential outcomes, as Timothy Morton suggests in *Hyperobjects.*[19]

In what follows, we provide our individual answers to these concerns. Our contrasting approaches substantiate our agreement on there being no single urban nature, but multiple ones, converging across varying scales, complexities and attributes. We have chosen to think with diverse urban natures, some hidden and others in plain sight. We believe that some are known and others remain unknown. Our perspectives draw from a wide variety of academic disciplines,

[15] E. Ellis, *Anthropocene: A Very Short Introduction* (Oxford: Oxford University Press, 2018).

[16] E. Kolbert, *The Sixth Extinction: An Unnatural History* (London: Bloomsbury, 2014).

[17] H. Bostic and M. Howey, 'To address the Anthropocene, engage the liberal arts', *Anthropocene* **18** (1) (2017): 105–110.

[18] R. Nixon, 'The Anthropocene: the promise and pitfalls of an epochal idea', in G. Mitman, M. Armiero and R. Emmett (eds), *Future Remains: A Cabinet of Curiosities for the Anthropocene* (Chicago: The University of Chicago Press, 2020), pp. 1–18.

[19] T. Morton, *Hyperobjects: Philosophy and Ecology after the End of the World* (Minneapolis: The University of Minnesota Press, 2013).

namely anthropology, history, geography, urban ecology, urban studies and landscape architecture. It is our hope that this diversity will help us all think differently about cities.

What's blue got to do with it?

L. Sasha Gora

Brown, bumpy logs dominate the reflecting pool's calm waters. Their shape promises this is a dam. Their russet colour makes this promise feel true. But what if the logs were electric cyan or yellow? Would the eye still be sure? In 2009 the artist David Diviney installed *Lodge* in a bus station's reflecting pool.[20] The sculpture appears life-like – as if a beaver is about to swim out. The logs, however, are PVC pipe dressed in construction adhesive to mimic the colours and textures of wood. What looks organic is synthetic. *Lodge* sets up a series of questions: Where does the built environment end and the natural one begin? What defines what is nature in 'urban nature'? If one looks beyond the wood and to the water, how does a wet approach contribute to how we might think with urban natures? And do descriptions of water as blue reduce its complexity and disguise how colour is in flux?

Colour creates meaning. It signifies beginnings and endings. Addressing Olafur Eliasson's immersive art installations, Louise Hornby writes that 'color becomes a condition of enclosure in the visible environment'.[21] Similar to how Acosta acknowledges the polysemy of 'nature' as a concept,[22] I address the polysemy of 'colour', focusing on colour as category in tandem with water colour as performance. And with colour, I look to Venice, Italy, as an example of urban nature with which to think with and through wetness and water.

[20] I discuss this in L.S. Gora, 'Beaver as offal: The presence and absence of beaver in Canadian cuisine', in M. McWilliams (ed.), *Proceedings of the Oxford Symposium on Food and Cookery 2016: Offal* (London: Reaktion Books, 2016), pp. 200–210.

[21] L. Hornby, 'Appropriating the weather: Olafur Eliasson and climate control', *Environmental Humanities* **9** (1) (2017): 60–83, p. 67.

[22] See R. Acosta (introduction to this article).

Figure 1. *Zona Gialla*.

Source: L. Sasha Gora.

Colour is neither reliable nor consistent. 'Colour is fragile and contingent', writes Esther Leslie. 'Colour is fleeting, fugitive, unstable, more attuned to the memory than to the objective world, always escaping or seeping away … Colour is mobile.'[23] No matter how much one trusts red to mean stop and green to mean go, colours and their meanings are not stable. Nonetheless, colours organise the world. In 2020 Italy promoted colour as a guide to its ever-changing COVID-19 regulations. Red is danger. Orange is a lighter shade of bad, and yellow is better, a bit. Then Italy introduced white to signal 'we're almost in the clear, almost'.

Absent from this colour palette are blue and green. 'Green dominates our thinking about ecology like no other', writes Jeffrey Jerome Cohen.[24] He admits this makes some sense; however, it also has blind spots. Confronting imaginations of the environment, Lawrence Buell writes: 'Ecology as green also perpetuates the implication of binary nature-culture separation'.[25] So what role does water – and its prism of colours – play in definitions of urban nature? How does water reinforce or destabilise land-centric imaginations?

The city of Venice challenges this nature-culture separation. Sandwiched between the sea and the mainland, Rita Vianello describes the Venetian Lagoon as an 'aquapelagic assemblage', making it clear it is not 'a natural environment'.[26] Instead, it is the outcome of centuries of labour: the labour of tides and of humans. Without the latter, the sea would have long ago swallowed the lagoon. Venice may be an extreme example, but Dilip da Cunha and Anuradha

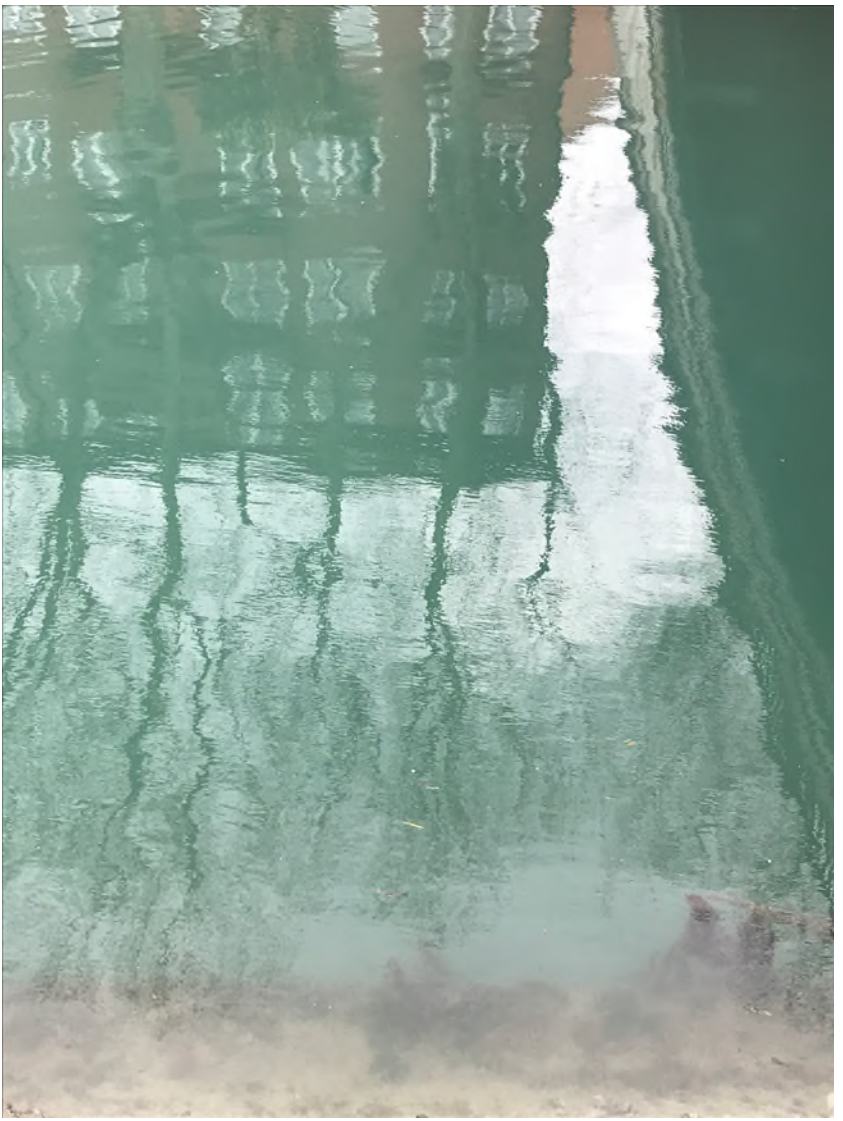
[23] E. Leslie, *Synthetic Worlds: Nature, Art and the Chemical Industry* (London: Reaktion Books, 2005), p. 247.

[24] J.J. Cohen, 'Introduction: Ecology's rainbow', in J.J. Cohen (ed.), *Prismatic Ecology: Ecotheory beyond Green* (Minneapolis, University of Minnesota, 2012), pp. xv-xxxvi, at p. xix.

[25] L. Buell, 'Foreword', in J.J. Cohen (ed.), *Prismatic Ecology: Ecotheory beyond Green* (Minneapolis, University of Minnesota, 2012), pp. ix-xii, at pp. ix–x.

[26] R. Vianello, 'The MOSE machine: An anthropological approach to the building of a flood safeguard project in the Venetian Lagoon', *Shima* **15** (1) (2021): 94–120, p. 100.

Figure 2. *Zona Arancione*.



Source: L. Sasha Gora.

Mathur assert that 'wetness is everywhere'.[27] The land-water binary reduces water to a subservient position. The cost of this land-centric imagination is that it views water as 'non-compliant, unpredictable, and violent, yet somehow controllable'.[28] In Venice water is the star attraction. But it is also the villain. As much as water defines the city, it also threatens it.

Like a prism, seawater absorbs and scatters light. Rebecca Solnit explains that 'water is colorless, shallow water appears to be the color of whatever lies underneath it, but deep water is full of this scattered light'.[29] Blue dominates watery discussions; however, Melody Jue destabilises this pairing by revealing that 'the ocean has not always been blue'.[30] She chronicles its historical colours like *hwit*, the Old English word for white, which sees the ocean's surface as 'the gleaming of stars', and Homer's 'wine-dark sea'.[31] Aligning with the *Odyssey*, Stacy Alaimo calls water's deepest depths violet-black.[32] Homer's mother tongue does not have a word for blue – an absence many ancient languages share.[33] 'Seeing blue depends', Jue summarises, 'not only on physiology but on cultural standardizations of vision'.[34]

[27] A. Mathur and D. da Cunha, 'Wetness is everywhere: Why do we see water somewhere?' *Journal of Architectural Education* **74** (1) (2020): pp. 139–140.

[28] A. Mathur and D. da Cunha, Ocean of Wetness: A Platform for Design. https://www.mathurdacunha.com/ocean-of-wetness (accessed 1 Dec. 2021). See also S. Helmreich, 'Nature/culture/seawater: Theory machines, anthropology, oceanization', in S. Oppermann and S. Iovino (eds), *Environmental Humanities: Voices from the Anthropocene* (London and New York: Rowman & Littlefield, 2017), pp. 217–236, at p. 218.

[29] R. Solnit, *A Field Guide to Getting Lost* (New York: Viking, 2005), p. 20.

[30] M. Jue, *Wild Blue Media: Thinking Through Seawater* (Durham: Duke University Press, 2020), p. x.

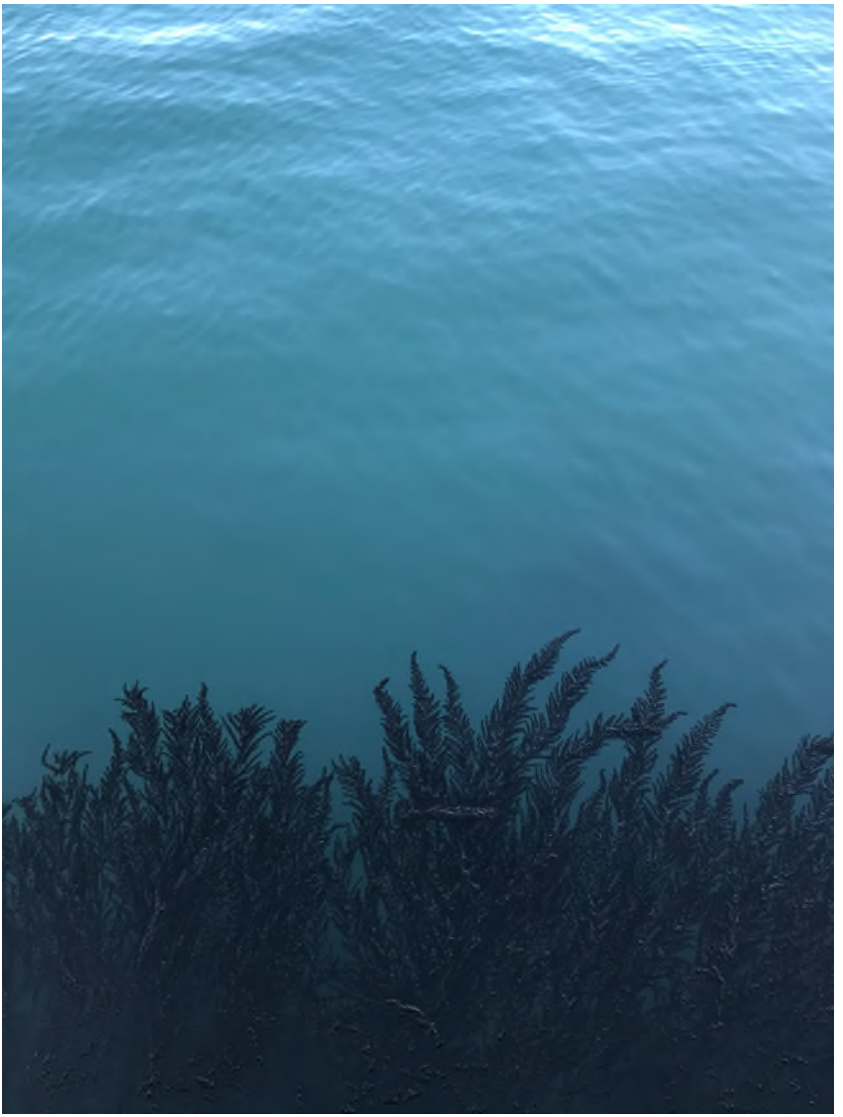
[31] Ibid., p. x.

[32] S. Alaimo, 'Violet-black', in J.J. Cohen (ed.), *Prismatic Ecology: Ecotheory beyond Green* (Minneapolis, University of Minnesota, 2012), pp. 233–251, at p. 233.

[33] Jue, *Wild Blue Media*, p. x.

[34] Ibid; Franz Boas's doctoral dissertation, submitted in 1881 to the University of Kiel, was titled 'The nature of the color of sea water'. See also C. Mavor, *Blue Mythologies: Reflections on a Colour* (London: Reaktion Books, 2013), especially Chapter 19, 'Venice is a wet map: *Tadzio is blue*'.

Figure 3. *Zona Rossa*.



Source: L. Sasha Gora.

Reporting on Italy's 2020 lockdown, headlines described Venice's canals as 'crystal clear'.[35] But they also advised against reading clear as a synonym for clean. Clear water says little about pollution, but it does say something about traffic. Fewer boats mean sediment stays put. In his Venice account, Peter Ackroyd asks: 'What is the colour of the water in the canals and in the lagoon?' His answer is a rainbow – from lilac, lavender and smoky pink to pale blue, jade green and brown. 'On a hot afternoon the waters may seem orange', he writes. 'The colours of the sky, and the colours of the city, are refracted in little ovals of ochre and blue. It is all colours and no colour. It reflects, and does not own, colour.'[36] In June 1968 Nicolás García Uriburu turned Venice's waters into a canvas for his painting *Coloration of the Grand Canal*. A gondolier paddled the artist up and down the canal as he released 30 kilograms of Fluorescein – a non-toxic powdered dye. The wake of motorboats, the dipping of oars, and the ebb and flow of the tide all served as paintbrushes, layering this glow-in-the-dark green with the water's other shades. For one day the canals sparkled chartreuse green – the type of green that feels at home in a miniature golf course's AstroTurf. In sync with the land art movement of the 1960s and 70s, García Uriburu's action used colour to make pollution visible, to paint how humans transform the waters they depend on. To visualise that, indeed, there is something in the water.

Heather I. Sullivan reads Goethe's writings on colour in relation to the Anthropocene. Goethe identified three categories: physiological, physical and chemical. Water is an example of a physical colour; light passes through a material and creates colour fluctuations.[37] Rather than static entities, Goethe saw colours as expressions of ongoing

[35] 'Coronavirus: Venice canals clearer after lockdown', *BBC News*, 18 Mar. 2020. https://www.bbc.com/news/av/world-europe-51943104 (accessed 27 Feb. 2023); J. Newton, 'The real story behind Venice's newly crystal-clear canals', *Afar*, 19 Mar. 2020. https://www.afar.com/magazine/clear-water-in-venice-means-the-return-of-wildlife (accessed 27 Feb. 2023).

[36] P. Ackroyd, *Venice: Pure City* (New York: Nan A. Talese, 2009), p. 278.

[37] H.I. Sullivan, 'Goethe's colors: Revolutionary optics and the Anthropocene', *Eighteenth-Century Studies* **51** (1) (2017): 115–124, p. 118.

Figure 4. *Zona Bianca*.

Source: L. Sasha Gora.

processes – as 'actively developing components of a world in flux'.[38] Sullivan calls this 'an ecology of color', which seeks to posit nature not as something or somewhere separate but 'as natural-cultural processes continually occurring *all around, through,* and *in us*'.[39] This reflection on water and colour and Venice has been an invitation to consider and challenge the role of the visual in 'seeing' urban nature.

'Colour is mobile', Leslie writes – a line I return to each time I cross a canal. Colour does not stay still. Italian COVID-19 responses see the pandemic in colours, which, in turn, impact the meanings of red and orange, yellow and white. Of water colour, too. These pictures – from February to March 2021 – match colour as category with water colour as a performance staged by canals and sediment, the wake and the tide. Each one pairs a portrait of Venice's canal water with a different COVID-regulation colour. Just like how some urban natures are in plain sight while others remain unknown, Venetian water colours flow from one shade to the next, flirting with green, then grey, and refusing to commit to blue.

Sacralising landscapes: constructing 'nature' in Osun Grove, Osogbo, Nigeria

Joseph Adeniran Adedeji

Evidence abounds that there are numerous notions of 'nature' in different cultural settings across the globe.[40] Accordingly, the provocation presented in the introductory section argues that urban nature can only be plural; it emphasises that notions of urban nature can be obvious or not.[41] My goal here is to argue that Yoruba 'sacralised' urban landscapes constitute one of the key underlying

[38] Sullivan, 'Goethe's colors', 116.

[39] H.I. Sullivan, 'The ecology of colors: Goethe's materialist optics and ecological posthumanism', in S. Iovino and S. Oppermann (eds), *Material Ecocriticism* (Bloomington and Indianapolis: Indiana University Press, 2014), pp. 80–94, at p. 80.

[40] Cocks and Shackleton, *Urban Nature.*

[41] See Acosta (introduction to this article).

characteristics of nature in Osogbo, Nigeria. The Yoruba are the largest ethno-linguistic group of Nigeria. They 'see' nature as both material and non-material, like body and mind. Because cities are made by humans for their habitation, both aspects of nature are deeply intertwined with their character. In accordance with Acosta's introductory provocation, I begin by proposing a broad dualism of nature. The Cartesian dualism refers to the human mind and body, or the human psyche and its biophysical exterior, which includes flora, fauna, water, land and air.

In René Descartes's mind-body dualism the mind appears to be more trustworthy and stable than the body.[42] In Yoruba cosmology, this dualism also manifests itself as celestial-terrestrial realms with an interface that I want to describe as the 'Yoruba worldview'. The celestial realm is mythically believed to be heavenly (*Orun*) but mediated through the earthly (*Aye*) material realm. This belief occurs in the Yoruba worldview interface where the heavenly celestials are constructed/conceptualised through spiritualisation of the earthly material, terrestrial elements. The sacralisation of these elements results in anthropomorphic animism through symbolic representation of the 'invisible celestials' constructed in Yoruba spirituality to reside in elements outside of humans.

The earthly material, terrestrial symbols are seen as representations of the heavenly celestials. How then does this Yoruba worldview occur? Through cognitive capacity to perceive spiritual forces, the Yoruba worldview focuses on the more-than-human forces and not on the material symbols. As people cannot sense other minds and therefore must rely on indirect perceptions of other beings, the same applies to sensing material symbols of gods, which can be perceived through nonhuman elements of nature. Invariably, the perceptions of gods and minds are predictably processed in similar ways by the same neural mechanism since mind perception is fundamental to spiritual cognition.[43]

[42] R. Descartes, *Meditations on First Philosophy*, trans. J. Cottingham (Cambridge University Press, 1986). Originally published as *Meditationes de Prima Philosophia, in qua Dei existentia et animæ immortalitas demonstratur* in 1641.

[43] W.M. Gervais, 'Perceiving minds and gods: How mind perception enables,

I want to illustrate these Yoruba religious practices with the Osun Grove United Nations Educational, Scientific, and Cultural Organisation (UNESCO) World Heritage Site, Osogbo, Nigeria.[44] Yoruba settlements are normally adjacent to mystic forests called 'groves'. Traditional Yoruba people believe that the groves are the abodes of more-than-human forces like spirits, gods, goddesses, deities and celestial divinities. For this reason, the groves are sacralised and conserved through ritual practices.

Most of the groves have gone extinct or are threatened with extinction because of land-use pressures that result from intense urbanisation. Osun Grove is the place of the first settlement in Osogbo. Inscribed as a UNESCO World Heritage Site in 2005, and one of only two in Nigeria, it is the largest surviving Yoruba grove in West Africa (located at the edge of Osogbo city). Approximately 72 acres in size, it is a sacralised, conserved and protected rainforest landscape adjacent to residential neighbourhoods and administrative and educational built facilities. Osun Grove encompasses rich urban ecosystems of flora and fauna along the River Osun, which archetypally represents the Yoruba divinatory and cosmological system.[45] These ecosystems are home to forests, animals (for example, monkeys), humans (devotees of traditional religions in the Yoruba pantheon; tourists; local, national, and international government officials), invisible spirits and more-than-human forms of life general-

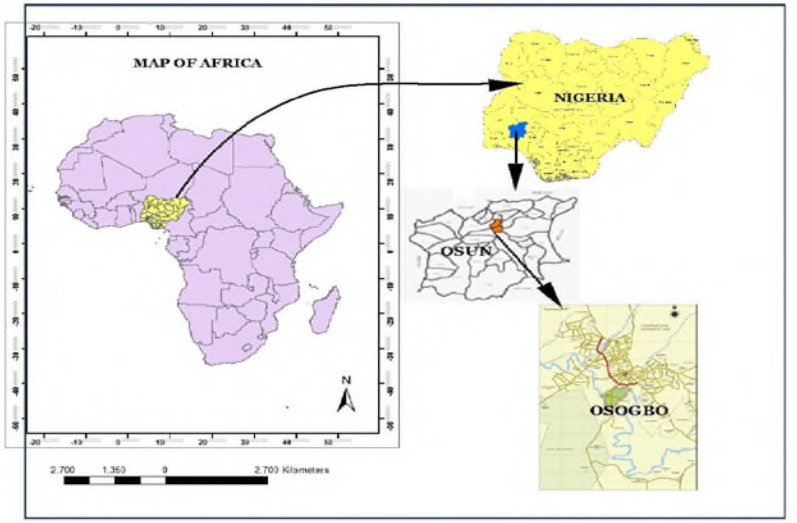
constrains, and is triggered by belief in gods', *Perspectives on Psychological Science* **8** (4) (2013): 380–394; J.A. Adedeji, 'Urban biocultural identity of Yorubas: Intersection of philosophy and nature for wellbeing at Osun Sacred Grove UNESCO Site, Osogbo, Nigeria', in M.L. Cocks and C.M. Shackleton (eds), *Urban Nature: Enriching Belonging, Wellbeing and Bioculture* (London: Routledge, 2020), pp. 51–66; O. Olusegun, 'Yoruba indigenous drums: An aesthetic symbol in ecological ritual of the Yoruba people', *European Scientific Journal* **11** (5) (2015): 214–230; R.A. Mowatt, 'Understanding Ifá: Inserting knowledge of an African cosmology in leisure studies and nature-based research', *Leisure Studies* **37** (5) (2018): 515–532.

[44] J.A. Adedeji and J.A. Fadamiro, 'Urbanisation forces on the landscapes and the changing value-systems of Osun Sacred Grove UNESCO Site, Osogbo, Nigeria', *Landscape Research* **43** (6) (2018): 798–816.

[45] See Figures 5, 6 and 7.

ly, all of which act collectively to frame the urban cultural landscape. Yoruba cosmology informs human perception of the ecological parts of the urban environment through initiation of the devotees into the religious cults while non-devotees use the landscapes for non-religious ecosystem services. The cults symbolise invisible natural forces, like gods, goddesses and spirits, that devotees believe to be agents of the Supreme *Olodumare* (God) and to be embodied in aquatic life and in plants, particularly trees. The fauna is believed to be an endemic part of the invisible natural forces. The animistic, anthropomorphic and artistic sculptures of the natural forces are placed near these elements of nature as shrines where they are invoked through placation. Therefore, the biocultural complexity of Osun Grove and Yoruba worldviews have shaped the idea of urban natures through traditional religious practices of incantations, spiritism, sacrificial offering and communication with disembodied spirits believed to be embodied in elements of nature.

Figure 5: Maps of Osun Grove in Africa.



Source: Joseph A. Adedeji.

Figure 6: Fence wall of Osun Grove, Osogbo, Nigeria.

Source: Joseph A. Adedeji.

Figure 7: Iya Mopo Shrine inside Osun Grove, Osogbo, Nigeria.

Source: Joseph A. Adedeji.

During an ethnographic field study conducted at Osun Grove, a key informant, Muslim and Osun goddess devotee, the Aworo of Osogbo, affirms that:

> This place is called the altar of Osun-Osogbo sacrifice, or sacrifice junction (*Ojubo* Osun Osogbo). Everybody knows this place – where people make it, get healing, etc. No one comes to Osun and will not get what they want. Anyone who comes to Osun must come down here from anywhere to offer sacrifice to the goddess to have solution to their life problem. The Osun festival is a ceremony that is known worldwide. Everybody comes here for the celebration to worship Osun, appraise and pray to the goddess. Kings and governors come here for prayers yearly. You must not get here and curse yourself because it is a place of authority, where you have whatsoever you say. If someone mistakenly says something bad, it will happen in that person's life. This is a sacred place.[46]

His emphasis on the sacredness of this urban grove is based on the belief that these physical entities are inhabited by invisible spirits, deities, gods and the Osun goddess of the Yoruba pantheon.

The sacrificial offerings at the 40 shrines in the grove are carried out to invoke the spirit of the goddess believed to inhabit the river. To venerate this perception of the celestial, the terrestrial ecosystems of elements of nature are combined with symbolic representations of these spirits, gods, goddesses and deities by constructing physical images and statues that embody them.

To this end, Aworo emphasised that:

> There is no religion that can overcome the Indigenous religion. Osun itself establishes itself here such that no wind can blow it off. There is no religion that can displace Osun. Who can displace God? Osun has spread across the world, both to the western world and in Africa. People know that Osun cannot be ignored. People are always serious in their worship to Osun, to receive something from it.[47]

His assertion foregrounds the reason why natural elements of the Grove are seen in Yoruba worldview as representing the gods

[46] Chief Osunbunmi Okangbe (The Aworo of Osogbo, Osun Grove, Osogbo, Nigeria), in discussion with the research assistants of the author, Jul. 2019.

[47] Chief Osunbunmi Okangbe, discussion.

in Yoruba cosmology. The allusion to the relationship of the goddess with the Almighty God of the Christian theology signifies the Indigenous belief in the agency of the disembodied gods. With this illustration, portraying disembodied spirits embodied in natural elements, I return to the mind-body philosophy of nature in Indigenous religions. Barlev and Shtulman provide nuanced insights into the notions of 'disembodied beings like all-powerful gods, guardian angels, demonic spirits' to be culturally produced as a form of 'learned dualism'.[48] This is generally inherent in Indigenous religions of African and Afro-Brazilian stocks.[49] They believe in rituals and metaphysical connections to invoke or placate ancestors or spirits when they are believed to be offended.[50]

The embodiment of the gods in the Yoruba pantheon is carried out with the agency of elements of nature. On-site observations of the shrines dedicated to these gods confirm this embodiment and the belief system sustained through socio-cultural agency. Frank Lloyd Wright pointed out that nature should be written with a capital 'N', not because God is nature but because all we can see in nature we would see in God.[51] In a similar way, aside from everyday practices, the Osun Osogbo festival is celebrated in the month of August every year with global attendance of devotees, tourists and urban government officials.

The understanding of nature discussed in the preceding paragraphs shows the power of religion in shaping human perception of the urban environment. It combines traditional theology and

[48] M. Barlev and A. Shtulman, 'Minds, bodies, spirits, and gods: Does widespread belief in disembodied beings imply that we are inherent dualists?', *Psychological Review* **128** (6) (2021): 1007–1021, p. 1017.

[49] J.M. Murphy and M.M. Sanford (eds), *Osun across the Waters: A Yoruba Goddess in Africa and the Americas* (Bloomington: Indiana University Press, 2001).

[50] P. Boyer, 'Informal religious activity outside hegemonic religions: Wild traditions and their relevance to evolutionary models', *Religion, Brain & Behavior* **10** (4) (2020): 459–472; Barley and Shtulman, 'Minds, bodies, spirits, and gods', 1017.

[51] W.A. Bauman, K.J. O'Brien and R. Bohannon, 'The dangers of building without ambiguity: Spirituality and utopianism in Frank Lloyd Wright', in W.A. Baumann and K. J. O'Brien (eds), *Environmental Ethics and Uncertainty* (London: Routledge, 2019), pp. 96–109.

ecology to examine landscapes and how the notion of urban nature informs ecological conservation. Conservation strategies include a taboo system that forbids animal hunting and cutting of the forest trees, believed to be abodes of the spirits, and UNESCO conservation legal frameworks that take cognisance of the urban ecotourism services of the Grove and maintain its forest ecology. With rapid urbanisation and the current overwhelming influence of non-Indigenous religions in Yoruba land, this eco-cultural value system is fast diminishing. This case shows that although people can experience urban spaces in many different ways, the sacralisation of urban environments can be particularly meaningful to people.

Is there an urban nature? A reflection on cities and design

Maan Barua

In 1976, shortly after 'The Emergency', when India witnessed several notorious slum clearances, Jai Sen, the architect and housing-rights activist, wrote a remarkable article titled 'The unintended city'. In this now somewhat forgotten text, Sen took the Eurocentric political and developmental imaginary that underpinned India's urban planning and design to task. The Indian metropolis, Sen wrote, was one where it was common to see a herd of cows grazing in parks and *maidans*, taking a quiet route across traffic-laden roads and returning home in the evening. Such homes were *bastis* within the Indian metropole where people ate, slept and lived 'next to and above cattle', much to the chagrin of 'social planners' who considered other-than-human presence to be 'curious, abnormal and a health hazard'.[52] This pastoral and agrarian ethos, Sen contended, constituted the unintended city, a city made by people and their practices *in spite of* planning and majoritarian codes of assembly.

In this brief essay, I would like to address a fundamental question

[52] J. Sen, 'The unintended city', *Seminar* 500, 2001 [1976]. https://www.india-seminar.com/2001/500/500%20jai%20sen.htm (accessed 8 March 2022).

asked of urbanicity: Is there an urban nature?[53] And I would like to do so in a way that is hopefully inventive, touching upon themes regarding spontaneity and design. I take cues from the Indian folklorist A.K. Ramanujan, who once posed the same question – 'Is there an Indian way of thinking?'– in four different ways, simply by altering where the emphasis was placed.[54] Copying Ramanujan's style, one could ask: '*Is* there an urban nature?', 'Is there an *urban* nature' and 'Is there *an* urban nature?'. The same question invites different answers and opens up ways to interrogate notions of design that run deep within the urban imaginary. They evoke an alternate grammar of the urban, one, I argue, that has salience for understanding how cities are inhabited and made.

Is there an urban *nature?*

That cities are products of design runs deep in a whole tradition of urban practice and thought.[55] Design, by and large, rests on a hylomorphic model: the Aristotelian idea that to create anything one has to impose form (*morphe*) upon matter (*hyle*). Hylomorphism implies that form comes into being only in relation to a totality that pre-exists in virtual form: a *design*.[56] This very idea also has corollaries in nature. For instance, the biologist Richard Dawkins's argument that evolution *is* the evolution of the design of a creature, driven not by divine agency but by natural selection, is a case in point.[57]

Hence, the question, '*Is* there an urban nature?' and notions of design are inexorably linked. Design, I argue, gives urban nature a twofold identity. Firstly, it implies that urban environments are outcomes of the activity of building and, therefore, products of de-

[53] See Acosta (introduction to this article).

[54] A.K. Ramanujan, 'Is there an Indian way of thinking? An informal essay', *Contributions to Indian Sociology* **23** (1) (1989): 41–58.

[55] V. Flusser, *The Shape of Things: A Philosophy of Design* (London: Reaktion Books, 1999).

[56] T. Ingold, *Making: Anthropology, Archaeology, Art and Architecture* (Abingdon: Routledge, 2013).

[57] R. Dawkins, *The Blind Watchmaker: Why the Evidence of Evolution Reveals a Universe Without Design* (Harlow: Longman Scientific & Technical, 1986).

liberate design. There is little doubt that natures we witness in cities emerge through the ways in which metropolitan landscapes have been planned, the pathways through which flora from the world over have been brought to adorn boulevards and parks and the histories through which animal-related practices and trades are expunged from the urban.[58] What hylomorphic ideas of the built environment enact, however, is a primacy given to worlds laid by people and institutions – typically those who wield power – in advance of who or what inhabits such a world. By doing so, it polices who or what might qualify as an urban citizen or denizen.

But not all urban natures are products of deliberate design. Thus, when viewed from the perspective of design, natures that are unruly or recalcitrant, are equated with that which is 'unintentional', that is natures in spite of themselves, which are unfixed and spontaneous.[59] Non-designed nature, then, is that which emerges without blueprint or plan. Such natures undergo historical change, but there is no design to govern the outcome. This notion of the 'unintentional' rests on a distinction between what the scholastics termed '*essentia*' or the essence of a thing, and '*accidentia*' or the properties of that thing which arise by chance. What determines a distinction between design and accident is the nature of the bond between the thing and person. Urban natures thus become unintentional when the frame of reference is human design. But if we were to replace the frame of reference from humans to other-than-humans, would the view of what is urban nature be re-envisioned?

Is there an urban *nature?*

To illustrate another way of thinking about *urban* natures, let me furnish two examples, pulled out of my forthcoming book, *Lively Cities: Reconfiguring Urban Ecology*. In New Delhi, rhesus macaques (*Macaca mulatta*) use electric wires to negotiate the city, and by do-

[58] D. Brantz, 'Animal bodies, human health and the reforms of slaughterhouses in nineteenth-century Berlin', *Food & History* **3** (2) (2005): 193–215.

[59] M. Gandy, 'Unintentional landscapes', *Journal of Landscape Research* **41** (1) (2016): 433–40..

Figure 8: Exaptation: Macaques using electric wires to negotiate the city.

Source: Melissa Cooperman / IFPRI. Accessed via Flickr. https://www.flickr.com/photos/ifpri/35019423375/; CC BY-NC-SA 2.0.

ing so, they render the built environment into an arboreal world (Figure 8). The animals deploy this meshwork of wires to cross busy roads and bazaars, taking electrical infrastructure in directions completely unanticipated in its inaugural assembly. They spark power outages, much to the furor of urban residents and electricity-provisioning companies. More importantly, the rhesus is predominantly terrestrial or ground-dwelling in its rural and forest habitats. With the becoming-urban of the macaque, we also begin to witness a shift in their habitat and habits.

Macaques' use of electric infrastructure can be seen as non-design, but only if one is tethered to the hylomorphic idea that built environment is assembled according to a preconceived plan. A lot of Delhi's overhead tangle of electric wires emerges through improvisation: people hooking onto the grid via illicit connections, often

Figure 9: Urban peregrines in London with parakeet as prey.

Source: Nathalie Mahieu.

done to bypass payments and surveillance by the state.[60] These improvisatory practices are no less the product of design as are macaques' acts of repurposing the electric grid, making them reel in other directions unimaginable in planning and design. But neither are these acts purely spontaneous, happening by chance.

My second example has to do with what some ecologists call 'recombinance': the emergence of novel ecological relations, often between species with no past evolutionary history of co-composition.[61] In London, rose-ringed parakeet (*Psittacula krameri*) populations grew rapidly after birds escaped captivity and set up free-ranging, breeding populations. Whilst parakeets did not initially have avian

[60] L Criqui, 'Delhi: Questioning urban planning the electrification of irregular settlements', in A. Luque-Ayala and J. Silver (eds), *Energy, Power and Protest: Geographies of the Electric City* (Abingdon and New York: Routledge, 2016), pp. 86–111.

[61] I.D. Rotherham, *Recombinant Ecology: A Hybrid Future?* (Dodrecht: Springer, 2017).

predators, peregrine falcons (*Falco peregrinus*) and tawny owls (*Strix aluco*) now prey upon them (Figure 9), inducing shifts in parakeets' foraging behaviours and flying patterns. The urbanisation of peregrines in the city is itself linked to the rise of feral pigeon populations, indicating how the rise of novel urban natures does not unfold along just one particular axis but is contingent upon a suite of different relations.[62] Unlike Dawkins' view, there are a suite of relations but no design for the evolution of such relations. Neither are these actions simply spontaneous, for they involve a *correspondence* between a heterogeneous array of beings, each of whom draw the other into a field of activity, according to their own propensities and rhythms.[63]

Is there an urban *nature?*

If we move beyond design/non-design, a whole other set of intentions and world-making activities become possible for a reading of the urban. There is no singular urban nature, as Acosta points out, and no singular way of reading them either. A more pluralist account of urban nature becomes possible when we bring other-than-humans into the fray, one that is polyvalent – involving a number of different competencies – and polysemic – entailing different ways of making meaning, contingent on who or what is involved. I do not invoke pluralism in a relativist sense – that any one set of interpretations are as valid as others – but to draw attention to a different grammar for writing and reading cities.

To foreground the need for a different grammar for urban natures, let me return to Sen's essay that I cited at the outset. 'That a city should be urban', Sen argued, 'may sound quite self-evident but it is becoming increasingly a questionable fact as to how "urban" the cities of developing countries are'.[64] Sen's critique of 'the urban' is a particular one, directed at a colonisation of the term by a Eurocentric planning imaginary. A city without 'the urban', in this sense,

[62] M. Barua, 'Infrastructure and non-human life: A wider ontology', *Progress in Human Geography* **45** (6) (2021): 1467–1489.

[63] Ingold, *Making*, p. 31.

[64] Sen, 'The unintended city'.

is to invoke the city made through the practices of its inhabitants, rather than that of planners and their hylomorphic logics that police who should and should not belong. Similarly, a plural invocation of urban natures has political importance, for it shows how a range of forces and potentials make and unmake cities. Urban natures reveal how the urban is a lived achievement, forged not only by people and their everyday practices but also by other-than-humans and their distributed capacities and powers to act.

Forensic ecologies and evidentiary materialism

Matthew Gandy

How should we interpret urban nature? What analytical vantage points might offer the clearest insights? Acosta (this volume) highlights the relatively recent recognition of unique urban ecosystems.[65] His emphasis on the polysemy of nature as a linguistic construct resonates with the earlier observations of cultural critic Raymond Williams on the complexity of language as well as more recent interest in the decentring of environmental knowledge as part of a broader critique of European modernity. Acosta's expanded conception of nature evokes a number of recently emerging perspectives such as Deleuzian inflected assemblage theory, multispecies ethnographies and new materialist interest in other-than-human forms of agency.

Although we can trace earlier interest in distinctive forms of urban nature – especially in the fields of botany and ornithology – the attempt to theorise urban space as an integrated kind of socio-ecological system emerges in the early decades of the twentieth century in tandem with the wider development of urban ecology as a subfield within the biological sciences. The Chicago school of urban sociology, which drew on concepts from botany such as vegetation succession to interpret patterns of neighbourhood change, is often highlighted as an early example of an integrated approach to the

[65] See Acosta (introduction to this article).

study of the city. Indeed, the influential Baltimore school of urban ecology, developing since the mid-1990s, explicitly highlights this intellectual antecedent to their contemporary research programme.[66] The idea of the city as a kind of 'ecosystem' comprised of measurable interrelated components has now steadily expanded in scope to become arguably the dominant analytical vantage point within urban environmental discourse. Yet this systems-based approach to the interpretation of urban space has consistently struggled to make sense of urbanisation as a contested historical process. The naturalisation of capitalist urbanisation has rendered the delineation of alternative socio-ecological pathways obscure. These techno-managerial models of urban space do not articulate a non-capitalist ecological imaginary but rather a series of design-oriented modifications as part of emerging concerns with resilience, sustainability and the 'future proofing' of urban settlements.

Acosta highlights the tensions between 'expert knowledge' and the need to instil an ethos of care towards the fragility of urban ecosystems. This emphasis on different kinds of environmental knowledge opens up alternative perspectives to systems-based conceptualisations of urban nature. One fruitful avenue is the emergence of what we might term 'forensic ecologies', which combine critical insights from forensic architecture, a body of work developed by Eyal Weizman and his colleagues, with the long-standing deployment of forensic science in the interpretation of crime scenes.[67] The forensic architecture approach uses innovative collaborative methodologies to produce new forms of knowledge that are open to public scrutiny based on the painstaking investigation of contested or hidden events. In a similar fashion to urban political ecology there is an emphasis on various forms of social and environmental justice in relation to pollution, violence and the lack of democratic accountability. The

[66] J.M. Grove, M.L. Cadenasso, S.T. Pickett, G.E. Machlis and W.R. Burch, *The Baltimore School of Urban Ecology: Space, Scale, and Time for the Study of Cities* (New Haven, CT: Yale University Press, 2015).

[67] M. Gandy, *Natura Urbana: Ecological Constellations in Urban Space* (Cambridge, MA: The MIT Press, 2022).

complementary field of forensic science rests on the collection of specialised kinds of data that can uncover the precise circumstances surrounding serious crimes such as murder or genocide. This emphasis on the painstaking analysis of environmental traces resonates with established dimensions to urban ecology in fields such as botany, entomology, palynology and toxicology. Empirical observations are directed towards more nuanced accounts of causality that reveal a fuller understanding of legal culpability and ethical responsibility. This emerging research agenda clearly resonates with the application of critical legal studies in the environmental sphere and attempts to extend the 'rights of nature' in order to highlight specific categories of environmental crime such as 'ecocide'.

Underpinning the emergence of forensic ecologies is a sense of urgency to revitalise observational paradigms within the biological sciences so that esoteric fields of taxonomic knowledge can be deployed in new ways. The use of 'indicator species' plays a significant role here since organisms can serve as extremely precise 'sensors' or 'sentinels' for the monitoring of environmental change. Examples include the recording of data on the changing distribution of insects and other organisms in response to climate change, the detection of early signs for plant disease or the monitoring of migratory birds in relation to zoonotic aspects of urbanisation.[68] An emerging emphasis on 'radical empiricism' might also unsettle the institutional dimensions to knowledge production, opening up possibilities for the enrichment of public cultures of science through direct forms of citizen involvement in data collection and the closer scrutiny of knowledge production.[69] Concerns with 'scientific literacy' can be reoriented towards a democratic scientific practice that can move beyond both positivist epistemologies and narrowly Eurocentric circuits of knowledge.

What kind of post-positivist materialism might be implied by the use of forensic ecologies? An emphasis on 'evidentiary material-

[68] See for example, F. Keck, *Avian Reservoirs: Virus Hunters and Birdwatchers in Chinese Sentinel Posts* (Durham, NC: Duke University Press, 2020).

[69] See R. Lave, 'The future of environmental expertise', *Annals of the Association of American Geographers* **105** (2) (2015): 244–252.

ism' underlines the potential to disentangle observational paradigms such as site surveys or ethological accounts of animal behaviour from existing approaches to urban ecology that struggle to connect with critical insights into environmental change. The varieties of radical empiricism associated with forensic ecologies also point in a different direction to the horizontal modes of critique that are often associated with assemblage theory, actor-network approaches and much of the neo-vitalist literature associated with the Anthropocene. By using the term 'horizontal', I am emphasising those interpretative frameworks that struggle to incorporate power asymmetries, the circulatory dynamics of capital and thanatological dimensions to modernity.[70] There is clearly a degree of conceptual affinity between forensic ecologies and established critical paradigms such as urban political ecology, but the question of vantage points and the epistemological status of non-human others remains in a state of flux. Urban nature is a multifaceted cultural and material domain that requires a reconfiguration of existing analytical approaches so that the ongoing dominance of systems-based approaches can be effectively challenged. In this brief essay, I have suggested that forensic ecologies and associated forms of radical empiricism might play a useful role in sketching the contours for a new kind of conceptual synthesis that can combine existing strands of critical work to produce counter-hegemonic forms of scientific knowledge. Urban nature emerges as not only a contested material domain but also a vibrant testing ground for the articulation of alternative ecological imaginaries.

Using sensory history to find urban nature

Kara Schlichting

While urban historians have studied environments for decades, their scholarship has traditionally focused on tangible nature that is visible in the city, such as parks or water pollution. Yet as L. Sasha

[70] See A. Kornbluh, 'Extinct critique', *South Atlantic Quarterly* **119** (4) (2020): 767–777.

Gora foregrounds, understandings of nature can be inconsistent and fleeting.[71] The colours of Venice's waters, like Italy's colour-coded COVID-19 warnings that explicated health risks, change. As recent work on the sensory past and contemporary sensory experiences reveal, sensory perceptions and bodily experiences can illuminate other, often fleeting, experiences of urban environments.[72] I offer here three sensory frames with which to consider urban nature in addition to the visual: smellscapes, soundscapes and heatscapes.[73] These 'scapes' reveal that both the enormity and mundanity of environmental issues, from the global climate crisis to the quotidian smell of decay, are imbricated in the 'immediacy of our own bodies'.[74] Historicising how urban environments felt, smelled and sounded contributes to a 'sensorial urbanism' in which 'human corporeality … is inseparable from "nature" or "environment"'.[75] Bodily experiences shape the worldviews with which urbanites respond to environments that they themselves make and remake as part of a given city's society and politics.[76]

[71] See L.S. Gora (this article).

[72] W. Tullett, 'State of the field: Sensory history', *History* **106** (373) (December 2021): 804–820.

[73] M. Zardini, 'Toward a sensorial urbanism,' The Canadian Centre for Architecture, Apr. 2016. https://www.cca.qc.ca/en/articles/issues/16/the-rest-of-your-senses/34281/toward-a-sensorial-urbanism (accessed 15 Nov. 2021); K. Schlichting, 'Hot town: Sensing heat in summertime Manhattan', *Environmental History* **27** (2) (April 2022): 354–368; M. Zardini (ed.), *Sense of the City: An Alternate Approach to Urbanism* (Montréal, QC: Canadian Centre for Architecture, 2005); J.D. Porteous, *Landscapes of the Mind: Worlds of Sense and Metaphor* (Toronto: University of Toronto Press, 1990).

[74] A. Neimanis and R.L. Walker, '"Weathering": Climate change and the "thick time" of transcorporeality', in 'Climate change', special issue, *Hypatia* **29** (3) (Summer 2014): 558–575, p. 562.

[75] Zardini, 'Toward a sensorial urbanism'; S. Alaimo, 'Trans-corporeal feminisms and the ethical space of nature', in S. Alaimo and S. Hekman (eds), *Material Feminisms* (Bloomington: Indiana University Press, 2008), pp. 237–264, at p. 238.

[76] D. Ackerman, *A Natural History of the Senses* (New York: Vintage Books: 1990); R. Jütte, *A History of the Senses from Antiquity to Cyberspaces,* trans. J. Lynn (Cambridge: Polity Press, 2005).

Smell

Alain Corbin's pathbreaking 1982 *The Foul and the Fragrant: Odour and the French Social Imagination* mapped the social history of smell in Paris in the eighteenth and nineteenth centuries. Corbin modelled an accounting of senses not solely based on biology but also rooted in specific cultures and politics. Deodorisation and a reduced tolerance for stenches, Corbin showed, became a hallmark of modernity.[77] But has living in a deodorised, desensitised present elided the historic importance of smell as a way to know urban spaces? Such a question is at the heart of the growing field of olfactory history. Urbanites have long discussed and tried to legislate against unwanted odours – from manure, human faeces and animal corpses in Europe in the Middle Ages to industrial by-products in the nineteenth-century United States – to regulate urban nature. Smell historians underscore the environmental-health logic built around miasmic ontologies of clean air and foul odours.[78] Smellscapes and bodily sensations shaped notions of health, class and community identity in different ways across different spaces and time. The fact that smellscapes are unseen does not mean that they go unnoticed. City dwellers used (and still use) their noses to make sense of this unseen, yet omnipresent, facet of urban environments.

[77] A. Corbin, *The Foul and the Fragrant: Odor and the French Social Imagination,* trans. M.L. Kochan, R. Porter and C. Prendergast (Cambridge, MA: Harvard University Press, 1986). For a recent conversation on the evolution and possibilities of smell scholarship, see W. Tullett, I. Leemans, H. Hsu, S. Weismann, C. Bembibre, M. Kiechle, D. Jethro, A. Chen, X. Huang, J. Otero-Pailos and M. Bradley, 'Smell, history, and heritage', *The American Historical Review* **127** (1) (Mar. 2022): 261–309.

[78] D. Barnes, *The Great Stink of Paris and the Nineteenth-Century Struggle against Filth and Germs* (Baltimore, MD: Johns Hopkins University Press, 2006); D. Jørgensen, 'The medieval sense of smell, stench, and sanitation', in U. Krampl, R. Beck and E. Retaillaud-Bajac (eds), *Les Cinq sense de la ville du Moyen Âge à nos jours* (Tours: Presses Universitaires François-Rabelais, 2013), pp. 301–313; M. Kiechle, *Smell Detectives: An Olfactory History of Urban America* (Seattle, WA: University of Washington Press, 2019).

Sound

Sensory histories of smellscapes map objects that are inherently absent: odours are not archived to be sniffed decades or centuries later. Soundscape histories that predate late-nineteenth-century recording technologies face similar challenges.[79] Sound, like smell, is a quintessentially unseen, ephemeral aspect of urban life. Historicising the act of listening, historians of sound have charted how spaces and technologies shaped the sonic past, how changes to urban space affected urban soundscapes and how the semiotics of noise conveyed information and built 'auditory communities' in cities.[80] As Peter A. Coates surveys, in the early twenty-first century environmental scholars began incorporating sound into environmental questions. Coates offers three frameworks for investigating how sound has influenced the ways that people have understood and responded to a range of landscapes, urban, rural and wild, what he calls knowing nature through sound. Coates identifies the sounds of 'howling' and 'silent' wilderness (the call of the wild); the notion of natural sound and its detection in outdoor recreation (echoing questions about leisure in protected natural areas); and the impact of certain mechanically generated sounds on non-human creatures and on spaces shared by humans and non-humans (beastly noise).[81]

Nature and noise are imbricated in cities. Building on research begun in the mid-twentieth century, behavioural biologists Hans Slabbekoorn and Ardie den Boer-Visser found that the great tit (*Parus major*), a small songbird common across Europe, sang differently

[79] Kiechle, *Smell Detectives*; A. Boutin, *City of Noise: Sound and Nineteenth-Century Paris* (Champaign: University of Illinois Press, 2015).

[80] E. Thompson, 'Author Statement', in 'The roaring twenties: An interactive exploration of the historical soundscape of New York City', *Vectors Journal*, 2021. http://vectors.usc.edu/projects/index.php?project=98&thread=AuthorStatement (accessed 18 Nov. 2021); Boutin, *City of Noise*; D. Garrioch., 'Sounds of the city: The soundscape of early modern European towns', *Urban History* **30** (1) (2003): 5–25; M.S.R. Jenner, 'Follow your nose? Smell, smelling, and their histories', *American Historical Review* **116** (2) (Apr. 2011): 335–351.

[81] P.A. Coates, 'The strange stillness of the past: Toward an environmental history of sound and noise', *Environmental History* **10** (4) (Oct. 2005): 636–665.

in cities than in the countryside. In urban settings, the species' birdsong was higher-pitched, shorter and faster. The biologists speculated that male great tits, a species notable for its ability to change its songs and learn new songs, adapt to be heard over anthropogenic urban noise, particularly the clamour of low-frequency traffic.[82] Considered through Coates's framework of the 'call of the wild', the acoustic signals of the great tit becomes novel among the city's mechanically generated sounds. A second example from New York City speaks to Coates's second and third frameworks: the notion of recreation tied to 'natural' sounds and mechanically generated sounds. In 2021 citizen complaints skyrocketed over noisy tourist helicopters that circled parks and jetted the privileged few to city airports and nearby resort communities. Helicopter critics, including Adrian Benepe, president of the Brooklyn Botanical Garden and former New York City parks commissioner, claimed the thunder of helicopters is detrimental to the benefits visitors seek when they go to the park. Can or should the environmental amenities of parks be protected from mechanically generated sounds?[83]

Heat

Heat and thermal comfort offer a window into scholarly analysis of climate as a sensual, haptic facet of urban nature. Geographer J. Douglas Porteous argues that visual perception of landscapes requires objectivity and distance, focuses that miss the 'tactile-kinaesthetic qualities of environment'.[84] The heatscape captures temperature sen-

[82] H. Skabbekoorn and A. den Boer-Visser, 'Cities change the song of bird', *Current Biology* **16** (December 2006): 2326–2331; H. Slabbekoorn and E.A.P. Ripmeester, 'Birdsong and anthropogenic noise: Implications and applications for conservation', *Molecular Ecology* **17** (2008): 72–83; H. Fountain, 'Birdsongs of the city', *New York Times*, 19 Dec. 2006. https://www.nytimes.com/2006/12/19/science/19observ.html (accessed 3 Mar. 2023).

[83] E. Brosnan and S. Burns, 'Complaints about helicopter noise skyrocket in NYC', WCBS Newsradio 880, 21 Oct. 2021. https://www.audacy.com/wcbs880/news/local/complaints-about-helicopter-noise-skyrocket-in-nyc (accessed 1 Nov. 2021).

[84] Porteous, *Landscapes of the Mind*, p. 6, p. 25, p. 27.

sation and climatological conditions. Heat affects all life forms, materials and processes in the city, most dramatically during heat waves. Yet quotidian issues also arise from the heatscape: the interaction of summer weather with a city's pavement; brick and stone create the urban heat-island effect. Luke Howard first identified the urban heat island in the early 1800s. This phenomenon creates significantly warmer temperatures in metropolitan areas due to concentrated development, absorbed heat and heat-producing human activities.[85] Heatscapes environ, penetrating the body and cityscape alike.

The heatscape incorporates the climatological features and their thermal impact on human bodies into the combined physical features of urban form. While summer heat often leads to leisure time being spent outside, in parks and on roofs, the heatscape can exacerbate inequalities. Tenement apartments represent not just housing inequalities but the environmental inequalities of the heatscape. 'The heat of the tenements during the summer months', a resident declared, was simply 'oppressive'.[86] Architect Edward T. Potter identified the summer heatwave of 1876 and the suffering it caused in tenements as his motivation to study heat challenges in New York City. To ameliorate the heatscape, Potter proposed airy model tenements as well an audacious 90-degree rotation of the street grid to take advantage of cooling prevailing winds. While his ideas earned praise at the 1898 Columbian Exposition in Chicago and the 1900 New York Tenement Exposition, his proposal to reorientate New York City was, unsurprisingly, never enacted. In the absence of citywide structural changes, individual residents had to improvise, finding their own ways of coping with summer heat.[87] Urbanisation and governmental policies have built thermal discomfort into urban

[85] K. Schlichting, 'Hot town'; K. Schlichting and M. Kiechle, 'Invisible inequalities: Persistent health threats in the urban built environment', *Journal of the History of Environment and Society* **5** (2020): 159–170.

[86] 'The recent "Hot Term"', *Frank Leslie's Illustrated Newspaper*, 12 Aug. 1882, 390.

[87] E.T. Potter, 'Concentrated residence studies … ca 1902', Folder 76, Box 1, MS3132 Blatchford, Potter, and Delano Family Papers, Patricia D. Klingenstein Library at the New York Historical Society, New York.

cores. Given the global urbanisation and rising temperatures of the twenty-first century, extreme heat is a mounting problem for urbanites, an environmental challenge that disadvantaged communities in large cities unequally shoulder. The nature of heat and thermal discomfort is at the centre of global environmental change and racialised urban inequalities.

Historicising soundscapes, smellscapes and heatscapes enables scholars to explore how people have perceived the unseen natural world through their bodies and how perceptions have varied across time and space. Research into senses beyond the visual provides a more comprehensive understanding of bodily experiences of cities throughout history. Sensory history is not only a catalogue of how the urban environment, for example, smelled at different points in time, but also an investigation into what people who experienced those times and places learnt about urban nature through not just their sights but from how they felt, what they heard and what they smelled.

Urban microecologies

Raúl Acosta

Cities are multi-scalar entities, and so are their natures. At the macro-level, they spread out across larger ecosystems (basins, landscapes, coasts) and human networks (production, resource extraction, connection, communication), which allow for flows of materials, life forms and ideas. At the meso-level, life forms coexist among substances that make up built environments and their atmospheres in a wide variety of configurations. But cities also have micro-levels, which are often underrated and overlooked. This essay offers a reflection of how such small-scale living environments provide keys to urban life and its multiple natures.

Mine is an anthropological interest in the significance of micro-scalar interactions among life forms and substances for issues relating to urban governance. While most procedures of urban planning and policymaking prioritise larger scales of interaction, the microscopic ratio of life and action often evades considerations despite its signifi-

cance. Small habitats in cities abound where organisms assemble in the soil, air, waterscapes, built environments and also among plants. Many of them are not visible with the naked eye yet leave their mark in other ways. These small urban ecosystems have only recently become objects of inquiries to better understand their aggregated effects, unexpected consequences or what they can reveal about city life.

An example of such engagement is Ecoducto, a project located in Mexico City. Ecoducto is a linear park built in the space at the centre of a twelve-lane avenue, which runs along what used to be a river. The park was originally envisioned by activists as a first stage towards the restoration of the river, in order to improve the quality of life in the city. The river was culverted (piped) in the 1950s and is now part of the city's sewage system. The park was designed to use a unique combination of filters, plants and bacteria to purify some of the sewage in order to irrigate the plants that lined the park. These in turn purify the air for visitors. As I walked along its 1.6 kilometres, I could not believe I was in the middle of a twelve-lane motorway. The air smelled fresh, and the sound of traffic was reduced to a quiet hum due to the plants. Furthermore, some placards along the park explained to visitors the role of the various plants and microorganisms for the purposes of the park. This combination of information and example through bodily experience helps locals understand the role of urban microbiomes. It is a case in which the micro-scale plays a role in altering the built form of the city and the residents' relationship with urban nature.

The current global COVID-19 pandemic is a reminder of how tiny forms of life can cause havoc in major ways, altering practices, infrastructures and procedures. It is an opportunity to pay more attention to the reverberations of not only viruses but also bacteria, fungi, chemicals, toxins and other compounds of urban life. The infrastructures (water and sewage) and private spaces (plumbing and toilets) of nineteenth-century cities were redesigned because of novel approaches to hygiene developed from germ theory. We may be on the cusp of new urban changes due to our sharpened scientific understandings of the micro-verse and the expanding technological possibilities to engage with it.

Ironically, microscopic evidence is helping archaeologists to examine our urban past while the micro-scale of our current cities is left mostly unattended. For decades now, detailed studies of sediments in city ruins have yielded information about changing climatic patterns and social practices of their inhabitants.[88] The method originally used by geological sciences was implemented after archaeologists realised that soil sediments were not only a vehicle for other 'things' but that they themselves constituted a rich record of various aspects of social, material and multispecies coexistence in cities of the past.[89]

Recent appreciation of urban micro-ecologies has concentrated on two arenas: urban microbiomes[90] and the study of toxic entanglements.[91] In both cases, the vast majority of studies emphasises the implications of small-scale ecosystems for human health.[92] In the first instance, the focus on microbiomes at the urban level itself scales up the surprises and conceptual shifts that a better understanding of human microbiomes has provoked.[93] A human microbiome is 'a community of bacteria that have a functional relationship to each other or to their host environment',[94] which can be found in the gut, the bladder and the skin. Such relationships can have 'key roles in our physiology, including our immune responses and

[88] R. Kulick, 'Urban micromorphology: A microecological narrative of a neopalatial neighbourhood at Bronze Age Palaikastro, Crete', *Geoarchaeology* **34** (4) (2019): 430–447.

[89] R.I. Macphail, M.A. Courty and P. Goldberg, 'Soil micromorphology in archaeology', *Endeavour* **14** (4) (1990): 163–171.

[90] O.G. Bahcall, 'Urban microbiome', *Nature Reviews Genetics* **16** (2015): 194–195.

[91] A. Swartz, S. Levine, H.A. Rother and F. Langerman, 'Toxic layering through three disciplinary lenses: Childhood poisoning and street pesticide use in Cape Town, South Africa', *Medical Humanities* **44** (4) (2018): 247–252.

[92] E.F.S. Roberts, 'What gets inside: Violent entanglements and toxic boundaries in Mexico City', *Cultural Anthropology* **32** (4) (2017): 592–619.

[93] E. Yong, *I Contain Multitudes: The Microbes within Us and a Grander View of Life* (New York: Ecco, 2018).

[94] C. Ainsworth, 'A bag of surprises', *Nature* **551** (7679) (2017): S40–S41.

metabolism, as well as in disease'.[95] At the urban level, there has been a realisation that microbes' 'contributions to biogeochemical functions … constitute critical "ecosystem services"'.[96]

Regarding toxicity, after decades of studies of pollution and water quality by natural scientists, anthropologists and geographers have examined the various layers of materiality and symbolism industrial production has spread in cities.[97] The vulnerability of certain human bodies to particular pollutants, for example, is often related to power and socioeconomic inequalities.[98]

For some, the realisation of the rich layers of life that exist on such micro-scale in cities offers a promise of extracting bacterial natural products for the development of small-molecule therapeutics.[99] On the other hand, there is also an effort to understand the way in which microbes affect human organisms. The logic of this is that in dense microbial populations, DNA and RNA may be exchanged among organisms,[100] which may affect some urban dwellers, including humans.

This has even led to private enterprises seeking to use such knowledge in order to alter the way in which cities are governed. One example is the focus on metagenomics within urban environ-

[95] M. Blaser, P. Bork, C. Fraser, R. Knight and J. Wang, 'The microbiome explored: Recent insights and future challenges', *Nature Reviews Microbiology* **11** (2013): 213–217.

[96] G.M. King, 'Urban microbiomes and urban ecology: How do microbes in the built environment affect human sustainability in cities?', *Journal of Microbiology* **52** (9) (2014): 721–728, p. 721.

[97] A.M. Nading, 'Living in a toxic world', *Annual Review of Anthropology* **49** (2020): 409–424.

[98] P.W. Geissler and R.J. Prince, '"Toxic worldings": Introduction to toxic flows', *Anthropology Today* **36** (6) (2020): 3–4.

[99] Z. Charlop-Powers, C.C. Pregitzer, C. Lemetre, M.A. Ternei, J. Maniko, B.M. Hover, P.Y. Calle, K.L. McGuire, J. Garbarino, H.M. Forgione, S. Charlop-Powers and S.F. Brady, 'Urban park soil microbiomes are a rich reservoir of natural product biosynthetic diversity', *Proceedings of the National Academy of Sciences* **113** (51) (2016): 14811–14816.

[100] S. Braaker, U. Kormann, F. Bontadina, and M.K. Obrist, 'Prediction of genetic connectivity in urban ecosystems by combining detailed movement data, genetic data and multi-path modelling', *Landscape and Urban Planning* **160** (2017): 107–114.

ments. That is, to study genetic material recovered directly from public transport and other popular public spaces. MetaSUB is an international organisation with a goal to improve city utilisation and planning through the detection, measurement and design of metagenomics within urban environments.[101] On their webpage, they justify their efforts by claiming to seek yet unknown microorganisms with qualities that may be useful for urban life, like biologically processing pollutants.

For others, the priority should be to promote healthy urban microbiomes to increase the well-being of all urban dwellers.[102] One way to reach such a goal is by rewilding urban microbiomes.[103] This is part of a trend towards the wider recognition of cities as ecosystems in which governance processes prioritise infrastructures and built environments that ensure well-being across species.[104] These processes require multiple layers of action, including the modification of built landscapes, ongoing biochemical studies and the involvement of local communities to ensure their understanding of biochemical interactions.

Concluding remarks

Matthew Gandy

As Raúl Acosta signals in his introduction, the aim of this essay collection has been to 'reflect on various unknown facets of urban

[101] The website for MetaSUB: Metagenomics & Metadesign of Subways & Urban Biomes. metasub.org (accessed 5 Dec. 2021).

[102] E.J. Flies, C. Skelly, R. Lovell, M.F. Breed, D. Phillips and P. Weinstein, 'Cities, biodiversity and health: We need healthy urban microbiome initiatives', *Cities & Health* **2** (2) (2018): 143–150.

[103] J.G. Mills, P. Weinstein, N.J.C. Gellie, L.S. Weyrich, A.J. Lowe and M.F. Breed, 'Urban habitat restoration provides a human health benefit through microbiome rewilding: The microbiome rewilding hypothesis', *Restoration Ecology* **25** (6) (2017): 866–872.

[104] R. Acosta, M. Aschenbrenner, E. Dürr and G. Winder, 'Re-imagining cities as ecosystems: Environmental subject formation in Auckland and Mexico City', *Urban Research and Practice* **15** (3) (2022): 350–365.

natures, on features that may appear self-evident but are often overlooked'. Acosta refers to 'a multiplicity of urban natures' in contrast to the kind of reductive or instrumentalised tropes that are often associated with architecture, engineering, planning and other professional fields engaged with the design, production and maintenance of urban space.

Our essays have multiple entry points: lagoons, microbiomes, monkeys, parakeets, sacred groves and the full complexity of the human sensorium. Our conceptual vantage points are similarly diverse, drawing on insights from cultural history, evidentiary materialism, more-than-human geographies, multispecies ethnographies, recombinant ecologies and other fields. We share a fascination with inspiration gained from direct encounters with urban nature in all its complexity. Indeed, our academic perspectives have been enriched through our links beyond the academy to other fields such as art, activism and conservation practice.

Acosta stresses the significance of language, pointing towards a more de-centred kind of urban environmental discourse that can emerge from multiple spheres of knowledge. It is worth reflecting on whether the Anthropocene concept itself marks yet another configuration of Euro-American thought that is anchored to existing analytical assumptions and epistemological frameworks, not least through its attachment to a 'species'- oriented account of human history. The increasing emphasis on the adaptive Anthropocene, as part of an urban resilience paradigm, signals a coalescence of ideas around market-based or technocratic interpretations of urban environmental policy. In contrast to the Anthropocene, however, there are other related conceptual fields of direct relevance to a more historically and geographically nuanced interpretation of urban nature. The Plantationocene, for example, stresses intersections between capitalist urbanization and the history of extractive frontiers, zoonotic threats to global health and the violent legacies of European colonialism.

There has been a shift of emphasis from examining ecosystems within cities (such as early botanical studies of urban biotopes) to an emerging focus on the city as an ecosystem in its own right. The idea

of the city as an ecosystem, with measurable throughputs of energy and materials, has been a significant dimension to systems-based thinking. The systems-based perspective on urban nature has become very influential, drawing on a successively wider field of disciplines to produce ever more complex models. It is notable, however, that the humanities and social sciences have routinely played a 'subordination-service mode' within these additive data driven conceptions of interdisciplinarity.[105] Is an alternative conceptualisation of urban ecology possible? My own reflections have led in the direction of a critical synthesis between, for example, the multi-sensory realm of affective encounters, the analysis of flows of capital in urban space and a recognition of the rights of nature to the city in an implicitly post-human elaboration of radical urban discourse. Above all, we need to articulate a more nuanced conception of urban nature that can resonate with the public realm as well as fields of education and professional practice.

Urban nature remains vulnerable to the charge of being 'false nature' from within more orthodox scientific paradigms. We need to look beyond misleading anti-metropolitan standpoints and recognise that there is no incompatibility between the appreciation of cosmopolitan urban ecologies and concern with global threats to biodiversity. It is the unique intellectual environment of the Rachel Carson Center in Munich that has brought us together to explore the question of urban nature in greater detail. It is instructive to note that the Rachel Carson Center has become the pre-eminent global hub for the environmental humanities; it is no coincidence that this distinctive intellectual milieu provided the setting for this exchange of ideas.

[105] See A. Barry and G. Born 'Interdisciplinarity: Reconfigurations of the social and natural sciences', in A. Barry and G. Born (eds), *Interdisciplinarity: Reconfigurations of the Social and Natural Sciences* (London: Routledge, 2013), pp. 1–56, at p. 12.

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