

Varia

## The *Umwelten* of Infrastructure: A Stroll along (and inside) Phnom Penh's Sewage Pipes

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**ABSTRACT:** What has the *Umwelten* of the ethologist Jacob Von Uexküll to do with the anthropology of infrastructure? Here, I address this question by taking the reader on an ethnographic tour around, and into, Phnom Penh's sewage systems. In common usage, infrastructures form the material basis for the provision of social services—as in roads and railroad tracks. Infrastructure has thus been viewed by conventional engineering and social science as a layer added on top of, or sunk into, nature. Meanwhile, the *umwelten* of different animals are said to vary because of their different bodies and perceptual apparatuses. Yet, over time, bodies and perceptual faculties are subject to ontological transformation as they enter into new relations with other beings. An ethnographic stroll with the sludge, animals, trees and plants, in and around Phnom Penh's sewage systems, allows me to address the implications of these ontological entwinements and transformations for an anthropological understanding of both infrastructure and *Umwelts*.

**KEYWORDS:** Infrastructure, Phnom Penh, Practical ontologies, Sewage, *Umwelten*

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In common usage, infrastructures form the material basis for the provision of social services—as in roads and railroad tracks. Infrastructure has thus been viewed by conventional engineering and social science alike as a layer added on top of, or sunk into, nature. As ‘first nature’ becomes ‘covered over’ by infrastructure, it is gradually severed from social experience. When people need water or heat, that is, they interact not with rivers or the sun, but with faucets and radiators. Thus, infrastructure turns into ‘second nature’ (Bowker 1995).

Recently, anthropologists have taken an increasing interest in infrastructure (Harvey, Jensen and Morita 2016). A vigorous and expanding body of work focuses on the social and political dimensions of infrastructure in the sense of second nature (e.g. Anand 2011, Jensen and Winthereik 2013), on the symbols and imaginaries surrounding them (e.g. Barker 2005, Sneath 2009), and on their organizational and technical dimensions (e.g. Bowker 1994, Pollock and Williams 2009).

Inspired by these developments, Alberto Corsin-Jimenez has recently developed an argument for “the right to infrastructure.” This right is premised on the idea that infrastructure is neither a human ‘entitlement’ nor simply a nonhuman object. Instead, the right to infrastructure defines a certain sensibility, enabling an escape from “the human–nonhuman and epistemology–ontology dichotomies ... by opening up the agential work of infrastructures as a source (an open source) of possibilities *in their own right* (2014, 343). While sympathetic to this argument, in this paper I argue that the escape from these dichotomies demands even more than heeding the agency of *infrastructures*. Inspired by the ongoing *jinbunken* project on “Umwelt”, I unfold this argument by juxtaposing the anthropology of infrastructures and the ethology of Jacob von Uexküll (1934/1992).

In his famous “A stroll through the worlds of animals and men: A picture book of invisible worlds”, von Uexküll observed that to understand animals one needs to grasp their usually invisible (to humans) self-worlds (1992, 319). Such grasping, he continued, might be accomplished by locating description at the level of the perceptual and effector tools of the animal. Whereas the first set describes what allows the organism to sense the world, the second designates the items that help it “effect” its purposes (319). In combination, we are told, these tool-sets “form a closed unit, the *Umwelt*” (320). With a view to characterizing animal *Umwelten*, von Uexküll enjoins his readers to follow him on a “ramble through these worlds of wonder” (320). In the following, I intend an analogous adventure. Only the “world of wonder” that will hold my attention is not that of the tick, *patella* snail, or hermit crab. Instead, it concerns the sewage system of Phnom Penh, capital of Cambodia, and its inhabitants.

At this point the anthropology of infrastructure and the ethology of *Umwelten* become mutually inflected. On the one hand, a focus on the relation between the sewage system vis-à-vis its many *Umwelten*, enable an escape route from the anthropological emphasis on infrastructure as merely *second nature for people*. On the other hand, an emphasis on infrastructure allows recognition that *Umwelten* are by no means delimited to supposedly natural

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habitats. The realm of pipes and sludge running under, and often over, Phnom Penh's streets, exhibit a complicated pattern in which different technological and organic agents operate as *Umwelten for one another*.

This case bears witness to a series of unstable, emergent and sometimes reversible interrelations between forms of 'nature' and *their kinds of agency*, and the cultures of infrastructure development. The conventional rubrics of nature and culture, or first and second nature, can do little analytical work in this context, for, as we shall see, the figure and ground of these terms switch constantly, depending on which entities one elects *to take a stroll with*.

### 1. Sewage

Phnom Penh's sewage infrastructure is in a fairly acute state of disorganization. Long-term neglect, due to the civil war, lack of bureaucratic organization, and of funds, means that only part of the city is served by the sewage system. Many pipes are leaking, clogged, or missing. The result is that waste does not flow smoothly. During regular periods of heavy rain the city floods. The JICA project for sewage improvement, conducted in collaboration with Phnom Penh city hall and Japanese contractors is meant to improve this state of affairs. It does so by replacing old pipes, adding to the network and building treatment plants and pumps, all of which entails complex social, political and technical arrangements (see Jensen 2016). Yet, something is also going on *inside* the pipes.

Underneath Phnom Penh's roads, in the pipes, or sometimes next to them, in open sewer channels, runs a flow, steady or obstructed, fast or slow, of liquid sludge. It is not particularly nice to experience as I had occasion to realize, joining an 'educational trip' organized by JICA (Japan International Cooperation Agency) experts into the sewers. Outfitted with protection helmets to match sandals and shorts, our small group passed no-entry signs and fences at one of the locations where new pipes were in process of being connected to the existing sewage network. Descending a ramshackle staircase with loose scaffolding, this little troupe of curious outsiders, NGOs consultants, officials, trainees, and a single ethnographer, toured underneath the city streets. It was dark down there, though sharp white lights lit part of the interior. Khmer workers, scarves wrapped around their faces to protect against dust, dirt and the unpleasant smell, were in process of finalizing this particular bit of new piping. At the end of the new 50-meter section, a barrier had been erected to prevent the sewage flow entering from the side of the already functioning pipe. When the section was ready, this barrier would be removed and the liquid sludge would merge with the new part.

The water was still and black. Not much to see, really, though quite a bit to smell. Even so, the interior of the underground pipes is awash with life. Comprised of excrement, urine, rainwater, foodstuffs, offal, chemical compounds from medicine, insect repellent and cleaning stuff, motor oil and much else good stuff, the waste is organic, at least in part, and home to

thriving bacteria cultures of all sorts.

That sewage sludge is not a single thing became visually obvious as we proceeded to visit a new sediment chamber, built behind the Royal Palace, next to the riverside. The area basically consisted of an open stream of water, running a circular route towards a meshed gate where sediment would filter. The channel had been carefully dug to prevent cutting down a magnificent old tree, growing on a small patch of land in the middle. Sewage entered the stream from different pipes. And how different it looked: one stream pitch black, another brownish, yet another almost milky white. These streams comprise mixtures of culture and nature in liquid form, their composition totally different (see also Schneider 2011: 89, 113). One stream might constitute an environmental health hazard even as another is more or less harmless. By the sediment chamber they are combined and led on as new mixtures.

We can recognize infrastructure, in the form of sewage pipes and sediment chambers, as a place where such different natures meet. For example, they take the form of different flows of sludge, each made up of very different elements that might be dangerous and safe, individually or in admixture.

Going inside the pipes lead us to see that “nature” in diverse forms, lives very well *within* “culture”. For these populations of microorganisms infrastructure is not external: it is *their* abode; where they perceive and effect their purposes. Rather than infrastructure (culture) taking the place of a now invisible nature, nature, in the form of innumerable life forms, live inside infrastructure. Complicating the situation further, the *Umwelten* of bacteria and other organisms are already hybrid, their survival tools shaped in part by the cultural flows that led to the making of pipes and the disposal of garbage and excrement in the first place (see Schneider 2011: 1–45).

## 2. Bacteria

Sludge flows through the complicated arrangement of pipes. Or ideally so. For part of the problem with the pipes of Phnom Penh is that it has never moved sewage very well. The article “Noses bent by city sewage”, published in the Phnom Penh Post in 2001,<sup>1</sup> explained that most houses use locally built septic tanks. This was still the case in 2014. These tanks tend to overflow during the rainy season, turning the streets into a “stagnant e-coli rich bacterial soup”, in which people nevertheless continue to wash, work and play. It is disputed, though, whether the problem is worse in the dry or rainy season.

Mr. Inoue, JICA’s sewage expert insists that the main problem is not flooding but drying.

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<sup>1</sup> Bainbridge, Bill & Bou Saroeun. 2001, March 16. Noses Bent by City Sewage. *The Phnom Penh Post*. <http://www.phnompenhpost.com/national/noses-bent-city-sewage>. (Accessed 2 September 2014).

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It is true, he says, that the water that inundates streets in the rainy season is dirty. But, not least due to JICA's long term project to improve the sewage system, begun in 1999 and still continuing, at a cost of at least 450M\$, flood levels are in fact decreasing. New piping has been laid in central areas, sludge suckers have been acquired to prevent clogging, and new pumping stations have been built along the riverside, and elsewhere, to get rid of excess water. Even as these efforts are compromised by other initiatives, especially the draining of lakes and marshes in order to clear space for upscale residential areas and shopping malls, inundation is slowly decreasing. No, Inoue says, the real problem is the dry season, when the flow stops.

During this period, large quantities of semi-dried sewage simply get stuck in the pipes. Perhaps it lives quite a satisfying existence there. But even as it does not move as intended by engineers—southward towards the marshes of Phnom Penh—it is not quite immobile. Instead it evaporates and moves *upwards*. The stench of sewage wafts across the scorching hot city streets, engulfing shops, motos and homes. And, so Inoue insists, it is these foul odors that are the true bringers of disease. The pumping stations built by JICA therefore also have the task of ensuring adequate movement of sewage in times of drought.

JICA money has also helped build the water treatment plant Niroth, which opened in 2013 with a 135,000 m<sup>3</sup>/day treatment capacity, filtration unit and a tank capacity of 23,000 m<sup>3</sup>.<sup>2</sup> Strolling *inside* of Niroth, we once again encounter particular streams of nature and culture. Pipes lead different water flows into a basin, where solids sink to the bottom while grease and other substances float. After separating these substances, the leftover liquids are treated—consumed by—populations of bacteria. And *their* leftovers are flushed.

Describing a beautiful old oak, von Uexküll wrote that “In all the hundred different *Umwelten* of its inmates, the oak tree as an object plays a highly varied role, at one time with some of its parts, at another time with others” (von Uexküll 1992, 388). Much the same thing can be said about Niroth's *basins*. Moreover, the interactions of bacteria and sludge *within* these basins are consequential for the organisms of people living in Phnom Penh. Invisibly, they shape the health of people throughout the city. Bacteria inhabiting treatment facilities *quietly solve* social and environmental problems.

We might say that the bacteria are hybrid entities put to work to solve hybrid problems. After all, sewage is a hybrid generated by changing social and cultural practice (including people's consumption patterns and the fact that there are more and more of them in Phnom Penh) in conjunction with changing environmental patterns (it rains more than ever, the flows of the Mekong and Tonle Sap rivers are changing, and it is getting hotter). Inside Niroth's

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<sup>2</sup> See JICA Press release. 2013, June 11. Phnom Penh Water Supply Extends to 1.7M Residents—Inauguration Ceremony of Niroth Water Supply Facilities on June 4<sup>th</sup> 2013. <http://www.jica.go.jp/cambodia/english/office/topics/press130611.html> (Accessed 31 October 2014).

basis and tanks, bacteria work upon bacteria in order to deal with these socio-natural problems. In the context of such multiple, interacting *Umwelten*, it is far from obvious where nature ends and culture begins, or even if these categories make much sense.

### 3. Morning Glory

Writing on the ways in which *people* in Johannesburg take on infrastructural qualities, the anthropologist AbdouMaliq Simone observed that in principle identities give way to de facto admixture. Even though Nigerians and South Africans may intensely dislike one another “this does not really stop them from doing business with each other, sharing residences, or engaging in other interpersonal relations” (2004: 419). Specific relational conjunctions of peoples’ practices generate relatively stable social composites that cut across divisive identity formations and enable people to pursue their goals. Thus, social relations operate as infrastructure for these varied pursuits. Simone’s argument is compelling, yet it leaves out of the picture the materials that facilitate the making of social composites. His premise is that Johannesburg’s infrastructure is in “ruins”, and this is why infrastructural qualities, by necessity, are delegated to people. Yet lively infrastructures endure even in states of ruination.

Phnom Penh’s sewage system, for example, though in many ways dysfunctional, survived not only the civil war and the Khmer Rouge period, but also subsequent, decade-long lack of attention and maintenance. It did not do its job well, according to many measures, yet cracked and leaking pipes, full of life, continued their secret existence<sup>3</sup> under the city’s increasingly busy streets. Only occasionally did they show their cards, bursting and flooding neighborhoods with dirty liquid. However, even in the days of total disrepair, not *all* sewage flooded the streets. Reversely, even today, where flooding in the central areas is on the decrease, the sludge is not treated. So where does all the sewage go?

Geography speaks. Phnom Penh, Penh’s Hill, named after its legendary founder, is located on a stretch of elevated land, created by the Mekong, Tonle Sap, and Bassac rivers. The most pronounced slope of Penh’s hill runs south. Phnom Penh’s piping system is therefore also oriented in this direction. Most of the city’s sewage, estimated in 2008 to consist of a daily output of “234 tons of feces, 2,335 cubic meters of urine and 8,154 cubic meters of gray water”<sup>4</sup> ends up in a series of marshy lakes, Boeung Trabek, Boeung Tumpun and Boeung

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<sup>3</sup> Secret existence is no exaggeration. To this day Phnom Penh city hall has no complete maps of the pipelines. Apparently they vanished with the civil war. In collaboration with JICA, city hall is now gradually trying to piece together knowledge of whether the older pipes run.

<sup>4</sup> Otis, Daniel. 2013, November 18. Putrid Lakes Offer Sweet Relief to a City Lacking Water Treatment Plants. <http://nextcity.org/daily/entry/putrid-lakes-offer-sweet-relief-to-a-city-lacking-water-treatment-plants/>. (Accessed 2 September 2014).

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Choeung Ek (infamous for Khmer Rouge mass killings in the 70s). After filtering through these lakes, the “gray water” eventually reaches the river.

This may sound like bad news, but recent evaluations have drawn the conclusion that the lakes function rather well as bio-filters, “effectively reducing pollutant loads in Phnom Penh’s wastewater before it reaches the Bassac River.”<sup>5</sup> Operating akin to an ad hoc “natural infrastructure”, the marshes deliver “critical services for human communities and economies” (Carse 2012: 540).

Officially, the southern marshes are government owned, but this has not prevented people from the countryside from building squalid houses at their edges. In turn, these encroachments are not unrelated to the fact that the water is also extremely nutritious. In Boeung Tumpun and Boeung Choeung Ek, water plants, including lotus and morning glory grow easily, and in abundance. Indeed, it is just these plants that absorb and naturally cleanse most of the sewage before it enters Bassac River. The natural infrastructure for Phnom Penh sewage consists of unspeakably stinky “dense morning glory fields” gardened by squatters.<sup>6</sup> It is no surprise that squatters, living, fishing and swimming in this noxious, yet oddly beautiful environment, are prone to disease.

From the point of view of the intersection of infrastructure and *Umwelten* it is particularly interesting to note the *loops* through which this system works. For the ‘dense fields of morning glory’ are not grown for personal consumption. Instead, they are harvested and transported to Phnom Penh’s markets, where they are turned into delicious smelling street meals, sold to restaurants or for home cooking.<sup>7</sup>

Government reports as well as scientific articles point to the presence of e.coli and parasites in morning glory grown in the southern marshes.<sup>8</sup> Human waste, transported by leaking, lively pipes, is bio-filtered by plants, protecting the river but making their growers sick. Eventually they end up on Phnom Penh’s dinner tables, ready to begin a new infrastructural iteration, thus illustrating, as von Uexküll would have it, “how the subject and the object are dovetailed into one another, to constitute a systematic whole” (von Uexküll 1992, 324). Within the “systematic whole” of this infrastructural loop, the fields of morning glory in dirty waters operate akin to Derrida’s (1981) *pharmakon*, at once poison and cure.

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<sup>5</sup> Ibid.

<sup>6</sup> *ibid.*

<sup>7</sup> Similar cases have been reported in Mexico City (Rosas *et al* 1984), and the phenomenon can likely be found elsewhere. I thank Ashley Carse for this information.

<sup>8</sup> Irvine, Kim N., *et al.* n.d. Spatial Patterns of E. Coli and Detergents in the Boeng Cheung Ek Treatment Wetland, Phnom Penh, Cambodia. <http://geography.buffalostate.edu/sites/geography.buffalostate.edu/files/uploads/Documents/publication7.pdf>. (Accessed 31 October 2014).

#### 4. Trees

Sludge flows inside the pipes, a teeming mass of organic and non-organic entities, whose underground activities affect peoples' lives on the ground in different ways. When the flow is obstructed, it creates health problems, as toxic fumes engulf city quarters. When the flow is regular, sewage turns into food for morning glories, which end up in the stomachs of Phnom Penh's population. And when the flow is beyond capacity, it leads to floods that impede normal city life, though in another sense, of course, this *is* normal city life. Whatever is going on underneath is consequential for what occurs above. But though the *processes and interactions* that generate these outcomes are mostly hidden from view, except for select specialists, the negative *effects* are broadly discussed. Thus, newspaper articles regularly criticize the city hall and JICA for their inadequate efforts to improve infrastructure.

In fact, though, significant efforts go into just such improvement, and they are orchestrated not least by Mr. Inoue and his colleagues. In collaboration with the Phnom Penh Water Supply Authority, JICA is engaged in a large-scale and long-term project for flood protection and drainage improvement. In 1999, when JICA began the project, the focus was on improving and constructing sluiceways, reinforcing dikes, and making pumping stations in the South West area. The second phase turned to the North East and built underground reservoirs, pumping stations, riverbank revetments, and an interceptor pipe along the Tonle Sap River. During the third phase, coming to an end in 2015, an old sediment chamber has been rebuilt, cleaning equipment for the pipes have been acquired (sludge suckers and high-water jet machines), and the gradual repair and extension of pipes continues.<sup>9</sup>

In spite of all these activities, the project is not met with unequivocal praise, and at the surface level of Phnom Penh's streets, the reason is not hard to see (Jensen 2016). Wherever one goes in the central area of the city, parts of roads, sidewalks and intersections are fenced off. Inside the fences, workers with hard-hats, surrounded by heavy equipment, dig into the ground, uncovering old pipes, repairing, fixing, replacing. When I described descending into the pipes, it was underneath one of these sites, next to the Olympic stadium. This kind of work is highly visible and it frustrates people. For one thing it slows traffic, for the pipes are always under roads. For another it prevents people from easy access to their homes or shops. In addition, the holes are attractive to flies and mosquitoes that enjoy the humidity.

From the point of view of JICA project workers, these tangible irritants give rise to frustrating exercises in public relation management. As they see it, temporary and minor prob-

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<sup>9</sup> JICA Topics and Events. 2013, October 28. JICA, City of Phnom Penh, and Local Residents Cooperate Together to Combat Flood in Phnom Penh –Flood Protection & Drainage Improvement in Phnom Penh (Phase 3). <http://www.jica.go.jp/cambodia/english/office/topics/131028.html>. (Accessed 31 October 2014).

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lems visible at the surface (traffic jams, pipe replacements), cast shadows over the long-term objectives and real achievements of the project (preventing floods and disease). Whereas intrusion into the underground creates a “visible transformation of dark surroundings” (Sneath 2009: 75), this visibility also obscures. In particular, what is obscure to the public eye is the very real difficulties inherent in achieving infrastructural improvements *amidst* these dark surroundings.

The fact that sewage infrastructure are something like the dark and invisible underbelly of visible urban lives, makes large-scale, long-term intervention in the crowded city-space a very hard sell to skeptical observers. They would prefer infrastructure to act as modern infrastructure is *supposed to*: invisibly but efficiently servicing human needs rather than very visibly invading urban space. In fact, however, one of JICA’s other problems is that the sewage pipes *do* invisibly and efficiently serve *other nonhuman needs*. Those of trees, for example.

Above, I referred to von Uexküll’s notion that trees themselves have “inmates,” for which they play highly varied roles. As he also noted, however, “the same subject show up as an object in a different *Umwelten*” (von Uexküll 1992, 383). In other words, while the tree operates *as* *umwelt* for other species, it also *has* its own different environment. That environment is the urban landscape and sewage system of Phnom Penh.

The architectural and urban outline of modern Phnom Penh owes much to the French Colonial period (1867–1949). Parks, villas and boulevards were inspired by French urbanity. Known as the “Paris of the East”, Phnom Penh reputedly caused a visiting Charlie Chaplin to compare its avenues to “little sisters” of the Champs Elysées.<sup>10</sup> It is underneath these avenues that pipes now run. Majestic trees line these French avenues. And it is the needs of these trees that are quite efficiently served by the pipes. Seeking nourishment, their roots branch downward. Finding no underwater streams, instead they touch upon sewage pipes.

Even small flowers are known to crack asphalt to get out into the open and the material of the original Soviet pipes was never of the best quality anyway. Picture the upward movements of flowers in reverse: massive roots working downwards to get into the pipes. The match up really is not fair. Just as the morning glories of the Southern swamps, Phnom Penh’s beautiful trees also find nourishment in the sewage. Only they do so before it has left the pipes. And thus, the sewage maintenance crew is waging a constant low-intensity battle against trees. At the ground level these skirmishes are invisible. They take place on the inside, where roots are cut and materials reinforced. And this is how it must be, for imagine the response if JICA, *in the name of sewage pipes*, were to advocate a general felling

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<sup>10</sup> National Museum of Cambodia. n.d. Streetscapes of Phnom Penh: A Leisurely Architectural Exploration. [http://www.cambodiamuseum.info/en\\_information\\_visitors/streetscapes.html](http://www.cambodiamuseum.info/en_information_visitors/streetscapes.html). (Accessed 31 October 2014).

of Phnom Penh's trees. This, then, is a battle premised on the different ways in which trees appear in, to, and for, different *Umwelten*.

In Ashley Carse's story, the landscapes surrounding the Panama Canal *become* infrastructure that delivers services to humans. "As infrastructure", he says:

nature is irreducible to a non-human world already 'out there'. It must, in its proponents' terms, be built, invested in, made functional, and managed. This is an active and inherently political process. As nature *becomes* infrastructure through work, human politics and values are inscribed on the landscape, much as they are embedded in arrangements of steel and concrete (Carse 2012: 540)

Yet, if one considers the case of Phnom Penh's trees this sequence can be rearranged. For example, as nature (food source for trees and morning glories), infrastructure is irreducible to a human world. It is not just that infrastructure must be built, invested in and so forth, but that it is inhabited, exploited and lived by nonhuman others. More than an issue of human politics shaping what gets to count as nature, this is a process in which innumerable entities invisibly transform infrastructures *and* *Umwelten*. Though human politics and values are surely embedded in infrastructures, once infrastructure becomes a source of nutrition for trees, the values and politics inscribed on the urban landscape ceases to be wholly human-oriented. Phnom Penh's trees thus *decenter* the question of infrastructural politics.

## 5. Decentering Infrastructure

Who are they, these beings so different from us and from each other? What do they do? What worlds do they make? What do we make of them? How do we live with them? (Raffles 2011: 3)

This paper has examined the sewage infrastructure of Phnom Penh by juxtaposing analytical themes from the anthropology of infrastructure and the ethology of Jacob von Uexküll. Shared among these different approaches is a sense of infrastructures and *Umwelten* as made up of partial connections (Strathern 1991), sometimes glossed as "more than one but less than many" (Mol and Law 2002: 10). As Alberto Corsin-Jimenez (2014: 348) argues, however, infrastructures can also be seen as "more than many and less than one". On the one hand, they remain open to indefinite futures and so they are inherently multiple, or "more than many." Yet, they never reach complete stabilization and so they are also "less than one." What comes into view is a sense of infrastructures as perennially incomplete, only partially existing, objects (Jensen 2010: 19–31).

The existing social scientific literature focuses predominantly on the mutual transformations of people, working with, or inhabiting infrastructures, understood as *technical systems*. Here, I have aimed to dislodge (Strathern 1985) this human-oriented worldview through elici-

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tation of the increasingly diverse relations that make up Phnom Penh's sewage infrastructure. Bringing the notion of *Umwelten* into the orbit of technical systems, this paper has shown that multiple nonhuman entities, such as organisms, sludge and trees, are *also* involved in making infrastructures, living in them, and changing them. By focusing on these entities, the paper has argued that such entities do not simply react passively to the infrastructure in which they find themselves living. As much as people, they are also "engineer[s] who operate the machine" (von Uexküll 1992, 321).

By making the multiplicity of infrastructure tangible, such a decentered approach sheds light on why the modernist dream of smoothly functioning infrastructures is so often disappointed. Even as they seem like stable technical systems from the outside, infrastructures tend towards instability because they are shaped by a multiplicity of interactions *on the inside*. That instability, therefore, is as much due to the activities of nonhumans as to those of humans. The sludge flowing silently under the streets of Phnom Penh's and the trees that enter the piping system from above, for example, each have seriously destabilizing effects on the material infrastructure and on the health of its human users. They have similarly destabilizing consequences for the analytical distinction between the natural and the cultural, which underlies and motivates much of the anthropology of infrastructure.

Even when turning to manifestly hybrid, nonhuman systems, like infrastructures, anthropology inclines towards the human perspective. Epitomizing this tendency, Simone (2004) renders infrastructure *as* people. With great attentiveness, he describes people continuously doing things together in ways that carried "traces of past collaboration and an implicit willingness to interact with one another in ways that draw on multiple social positions" (2004: 408). This "process of conjunction," he argues, generates "social compositions across a range of singular capacities and needs" (2004: 410). This is what he means by referring to people as infrastructure.

Nevertheless, the actors doing infrastructural things together are much else aside from human. While these actors certainly "carry traces of past collaboration" with them, these traces are not only defined by social positions. Again, even as processes of conjunction create composites across a range of capacities, as Simone writes, those composites are not exclusively social. The notion that people are infrastructure can be accepted only if interpreted in terms of Amerindian perspectivism (Viveiros de Castro 2004) according to which *almost anything, sludge and morning glories and included, might turn out to be people*.

In and around infrastructure, trees, bacteria, morning glories, entwine with flows of water, pipes, bicycle parts and cardboard, tuk tuks, people, policies. Anthropology has been much better at writing about the social values, imaginations and political projects of the latter than about the activities of the former, or about their implications, including for humans. The visible politics of Phnom Penh cannot be disentangled from the intricate invisible relations between pipes, morning glory, trees and sludge. This would not come as a surprise to

von Uexküll, for whom, as Heather Davis reminds us, “values are necessary for organisms to differentiate between the things in their environment and to adapt to them” (Davis and Latour 2015, 52).

On the final stop on the underground tour of Phnom Penh’s sewage systems, our small group is taken to a pumping station by the riverside. During times of flood, massive pumps force vast quantities of rain and floodwater back into the river. In the dry season, the huge pipes are damp and smelly but quiet. It is hard to imagine them filled to capacity with wildly flowing water. Something moves, barely, on the walls. I walk over, using my camera to get a bit of light—and step back in momentary disgust. The walls are covered by colonies of cockroaches. Hundreds, thousands of cockroaches, everywhere. They too make their lives within infrastructures. Who knows what happens to them when the flood comes?

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