Pipe Dreams: Sewage Infrastructure and Activity Trails in Phnom Penh

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Casper Bruun Jensen[†]

Independent Scholar

ABSTRACT *Focusing on the efforts of the Japan International Cooperation Agency to improve Phnom Penh's run-down sewage infrastructure, this paper offers an example of what a decentred anthropology of infrastructure might look like. The sewage infrastructure brings together a very diverse set of features, including pipes, road networks, economic considerations, demographic change, geography, climate change, flows of sludge and the lives of people in the city. Giving rise to significantly unpredictable and deeply material relations, the paper brings into view infrastructure as sites of immanent ontological experimentation; junctures where relations between society, technology and nature emerge in variable forms. The paper explores these relations by paying close attention to intersecting activity trails. Kandal market in central Phnom Penh is one site where trails of sewage and garbage collection converge with heavy flows of water during the rainy season. Pipe dreams, too, are generated at this conjunction, precipitating out of the pipes.*

KEYWORDS *Activity trails, pipe dreams, infrastructure, practical ontologies, Phnom Penh, sewage*

P hnom Penh seems like one big building site. Everywhere big buildings are sprouting up, covered in green safety nets, while workers climb the ramshackle, precarious looking scaffolding. But urban infrastructures do not only build upwards (Figure 1).

I took this photo in November 2013 at the intersection of Sihanouk and Monivong boulevards, close to Lucky, the most popular upscale supermarket until

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[†]Honorary Fellow, Leicester University.

Figure 1. *Gravel. Intersection of Sihanouk and Monivong Blvds. Photo by author.*

the opening of the Japanese Aeon Mall the following year. These are among the main arteries in the centre of Phnom Penh and usually heavy with traffic. The photo does not show much really, a bit of loose gravel close to the sidewalk. Even so, this bit of gravel forms the entry point for the present discussion. To see what this loose dirt indexes, what it teaches about Phnom Penh's rapidly developing urban infrastructure and its trails of activity, we will have to slowly but steadily unravel what lies beneath, and beyond, the gravel.

I did not take the photo randomly. Rather, I went back to the intersection in the hope of documenting what I had observed only a week earlier. On that afternoon, traffic had jammed completely and the reason was obvious. The middle of the intersection was closed off, a big yellow crane digging into the ground. Large signs explained that this was the site of the Japan International Cooperation Agency (JICA) project for flood protection and drainage improvement in the Phnom Penh capital city, Phase III. The digging itself seemed quite a massive undertaking. Yet when I returned a few days later, the machines and signs had moved to the edge of the intersection. And when I finally brought my camera all that was left was just a little bit of gravel.

The hole had disappeared, the machines moved on. Yet, as I looked around, somewhat disoriented, the scenery reappeared further down Monivong. Like some slowly moving snake, the operation had slithered down the street, covering its tracks as it went. Already having an interest in Phnom Penh's sprawling and chaotic infrastructures, my curiosity was piqued. What is the

purpose of this digging, I wondered, and what accounts for these sudden movements? The signs, of course, offered a clue: the activities were part of a JICA project. And since I knew people in JICA, playing tennis and barbecuing with them as part of the rather odd life of ex-pats in the city, I was able to identify a specialist in the know.

Before turning to what this informant had to tell me, the next section makes explicit the aim of this paper, an aim that aligns with the call for a decentred anthropology of infrastructure made in the introduction to the special issue. Such an anthropology elicits infrastructure in the form of ontological experiments. I go on to discuss how the experimental, ontological qualities of infrastructure can be articulated by focusing on the emergence of *activity trails*, which may intersect, transform, diverge and, sometimes, temporarily stabilize.

Activity Trails and Dirty Materialism

This paper contributes to what the introduction calls a decentring of the anthropology of infrastructure. Among the various motivations and entailments of such decentring is a general agreement with the estimation of the sociologists Antoine Hennion and Line Grenier that attentiveness to materiality and devices ought to be a central sociological and anthropological concern (Hennion & Grenier 2000).

According to these authors, there are two pitfalls to avoid if one wants to develop analytical sensitivity to 'materials' (p. 341). Material devices can be given their due only if they are seen neither as reflections of predefined sociopolitical structures, nor as determining the social. Or, with maximal simplicity: analyses that assume technological determinism and analyses that assume social, economic or political determinism are equally unsatisfying. However, the solution is not found in eclectically combining these two explanatory repertoires either.

Infrastructures are certainly made by the 'different forms of action, investment or involvement' (Hennion & Grenier 2000: 350) of many people and organizations. Yet, they consist of metal and machines as much as by meanings and discourse. Indeed, Hennion and Grenier argue that the objects, subjects and social groupings that form particular material arrangements are not even there to begin with, at least not in fixed form. This line of thinking gets into view infrastructures as assemblages through which 'particular objects, subjects and social groupings ... are coproduced' (Hennion & Grenier 2000: 350).

Hennion and Grenier describe such assemblages as 'conjunctural events' (p. 350). Seen as events rather than as stable structures, infrastructures are coales-

cences of heterogeneous actors. They are assemblages where multiple forms of agency and activity condense, but also where actors are given new form.

Their inherent experimental dimension is due to the fact that these new forms can rarely be predicted, and more rarely controlled. As conduits for the transformation of entities and relations between them, infrastructures thus participate in the propagation of new worlds or ontologies (Jensen 2015). Accordingly, one important task for a decentred anthropology is to find ways of getting the processes whereby this happens into view.

The notion of infrastructural inversion developed by the historian of science and science and technology studies (STS) scholar Geoffrey C. Bowker (1995) offers a relevant starting point for this endeavour. For Bowker, infrastructural inversion entailed an initial suspension of the search for cultural or ideological reasons for social change, encouraging instead examination of possible infrastructural causes. In a classic example of such figure-ground change, Bowker argued that whereas it used to be assumed that rises in life expectancy in the nineteenth century were due to improved scientific knowledge, the major causes actually related to changing systems of food production and consumption, and to improved sewage systems (1995: 235). As this example suggests, infrastructural inversion is premised on tracing the contours of infrastructure in order to analyse how they shape society in ways often unnoticed.

It is worth noting that the presuppositions of this approach are somewhat at odds with arguments that have recently been put forth by anthropologists of infrastructure. In STS, Leigh Star, Bowker and others have long insisted that a central and somewhat paradoxical feature of infrastructures is that their success is premised on remaining invisible (e.g. Bowker & Star 1999: 34). Successful infrastructures are infrastructures about which people, social scientists included, have stopped worrying. Conversely, visibility usually signals infrastructures in trouble, on the verge of breaking down or having already collapsed.

In his recent survey of the anthropology of infrastructure, Brian Larkin responded that 'as a way of describing infrastructure as a whole' this is 'flatly untenable' (2013: 336). Invisibility, he argued, is only the endpoint of a range of possible visibilities that 'move from unseen to grand spectacles and everything in between'. Indeed, Larkin pointed out, infrastructures are often very visible political projects and deliberately so. Thus, electricity has been a central symbol of modernity in Mongolia (Sneath 2009), and the Indonesian Palapa satellite system was heavily invested with symbols of traditional Javanese power (Barker 2005).

However, these clarifications are well taken, Larkin's critique misses one important point. Although it is certainly relevant to understand the role of infrastructure as symbols of state-making, such a focus also directs attention away from their specific materialities and the consequences of materialization. Yet, attention to these dimensions of infrastructure was one of the main strengths of the early STS studies. Thus, for example, although examining the television screens and advertisement boards where the benefits of infrastructures are turned into spectacle is valuable in its own right, it is of comparatively little assistance if one aims to understand the ways in which infrastructures transform urban space and livelihoods. For that we need something more akin to a 'dirty materialism' (Lea & Pholeros 2010). This requirement, however, also takes us further than the originating studies in STS.

In a study of aboriginal housing in Australia, Tess Lea and Paul Pholeros showed that, regardless of appearances, the pipes visible in newly-built houses cannot be assumed to be actual pipes, for everything depends on whether they are hooked into functioning arrangements. Unless materially connected to broader, workable infrastructures, it is no more possible to flush water with these pipes than to fill the pipe depicted in Rene Magritte's painting *Ceci n'est pas une pipe* [This is not a pipe] with tobacco. Lea and Pholeros' dirty materialism, that is, has as a premise a steady focus on the concrete arrangements that make up infrastructures or, crucially, do not make them up.

Such arrangements and their effects can be further elucidated with the notion of 'activity trails' developed by the philosopher Adrian Cussins (Cussins 2002: 11). Originally presented as a contribution to Bruno Latour's 'symmetric metaphysics' (Cussins 1992: 651), which famously extended agency to nonhuman entities (such as sewage pipes and their bacterial inhabitants), activity trails engender a view of cognition and subject-formation independent of any a priori 'distinction between the subjective and the objective' (Cussins 2002: 3).

Defined with deliberate minimalism, activity trails are simply patterns or 'forms of guidance through environments of activity' (2002: 11). Rather than seeing such patterns as an effect of the operations of the political, the technological or the social, Cussins suggested that it is, rather, the characteristics of activity trails that lend a sense of stability to those categories themselves. In contrast, for example, to phenomenological approaches that take human embodiment and sense-making capacities as their analytical ground, the notion of activity trails thus enables decentred analyses in which subject and object formations are emergent outcomes of material–relational processes.

Pipe Dreams

In the context of Phnom Penh's sewage infrastructures, a decentred anthropology of infrastructure can be further specified with reference to the term 'pipe dream'. This word has nothing to do with infrastructure as such: emerging in English in the late nineteenth century, it was supposedly used to describe the fantastic visions one might have from smoking opium. Nevertheless it resonates in several registers with the concerns of this paper.

Notably, the pipe dream has functioned as a category in the psychology of rumour (Knapp 1944). Thus, Robert Knapp, in charge of rumour control for the Massachusetts Committee of Public Safety, defined pipe dreams as 'wish rumours' that expressed the 'hopes of those among whom they circulate' (Knapp 1944: 24). As a state employee, Knapp's concern was to 'control the ravages of rumour' that might lead to irrational behaviour or social unrest (p. 37). Given his official position, there were good reasons why he did not pause to wonder whether such rumours might also found within, or indeed be instigated by, the state itself. Yet, when we consider the argument that states turn infrastructures into symbols of progress or national strength (Barker 2005; Larkin 2013), there are striking similarities between such efforts and the making of Knapp's wish rumours. Indeed, we might describe states and development organizations as *in the business of* generating infrastructural pipe dreams in this sense.

However, pipe dreams can also be seen in a different light. In their analysis of aboriginal housing, Lea and Pholeros (2010) take issue with the well-circulated rumour that the sorry state of these houses is due to the obstinacy and backwardness of their inhabitants. As noted, insistence that a pipe cannot be assumed to be real until further material inspection has revealed it to be so is central to their rebuttal of crude cultural imaginaries. Since the present paper deals with an infrastructure in which dirty pipes feature centrally, and in which rumours also circulate, their advice is well taken. But to what might pipe dreams refer if not simply the projections, fantasies and symbols of the state or the gullible public?

For Bruno Latour (1988), the notion of infra-reflexivity designated a form of reflexivity immanent to particular networks or infrastructures. This notion re-oriented the conventional view of reflexivity as socially embedded or integral to individual minds. Rather than situated 'in' a practice (cf. Gad & Jensen 2014), infra-reflexivity described the emergent, patterned effects of interactions as they become structured by activity trails. For example, infrastructural activity trails impose certain kinds of order and disorder on bits of the world – such as the urban spaces of Phnom Penh. Being 'more than human', consisting for

example of pipes, sludge and roads, they have 'object-ly' contents and ramifications. At the same time, they also generate the subject positions available to people. In terms of infra-reflexivity, pipe dreams can thus be seen as *emanations* of infrastructural arrangements – rather than primarily symbolic or political. In the particular case of sewage networks, they precipitate from the material arrangements and activity trails *of pipes*.

A Taste for Sewage

Mr Inoue's title is project formulation advisor for the JICA. He is elegantly dressed and speaks fluent, cosmopolitan English. A common acquaintance told me he reminded her of a character out of a Haruki Murakami novel. But appearances deceive, to an extent, for in spite of his elegance, Mr Inoue has dirt on his mind. I am not being metaphorical: in fact, he is a specialist in filth and sewage. With his guidance, I begin to decipher how sewage infrastructure shapes activity trails, which in turn – infra-reflexively – shapes subject and object positions available to people and things in Phnom Penh.

It was not in the cards that Mr Inoue would turn into a sewage specialist. After growing up in multiple countries due to his parents' travelling jobs, he received a BA in philosophy at a Japanese university and enrolled in a Master's programme in social science abroad. Upon receiving his degree, Mr Inoue got a job with JICA in Thailand. Transferred after some years to Cambodia, he became part of the section that deals with climate change. His job involves handling a portfolio of projects that offer infrastructural solutions to current and future problems.

In spite of his philosophical predilections, Mr Inoue became increasingly fascinated with the challenges of technical implementation. Rather than staying at the level of general planning preferred by most project advisors, he became immersed in the nitty-gritty of technical decision-making. A Japanese professor of anthropology with many years of JICA working experiences told me that 'there are not many Inoue-san's.' Improvement of the sewage and drainage systems of Phnom Penh is among Mr Inoue's main responsibilities.

As for this upgrade itself, we might say that it is long overdue, since the current piping system was put in place under the French colonial system. Around 60 years ago, it was modernized with support from the Soviet Union. But after the civil war (1970–1975), the system was in a state of acute disrepair, leaking and clogged with garbage. In many areas, the sewage is not contained in pipes but floats in open channels (Barton 2006).

Here we need just a bit of technical detail. Phnom Penh's sewage system is a so-called combined system. This means that a single pipe transports human waste as well as drains excess water. This kind of system is common in many parts of the world, since it is both easier and cheaper to lay single rather than double pipes. But it also creates problems. The general issues are relatively easy to grasp, though the solutions are not.

As Phnom Penh grows in size and becomes more crowded, there are increasing amounts of garbage in the streets and the pipes are more prone to clogging. As Mekong and Tonle Sap river floods increase in severity due to climate change, the pipes need to deal with larger quantities of water. When the pipes cannot contain the water, the city floods. And it floods not only with rain and river water, but also with the human waste that overflows the pipes.

We can pause to observe that these descriptions align with Anand's (2011) argument for the relevance of 'pressure' as a concept with which to understand configurations of technology, environment and politics. Anand considers the importance of multiple forms of pressure for what he calls the 'poli-technics of water supply' in Mumbai and the formation of 'hydraulic citizenship' (2011: 545; cf. Wittfogel 1957). The intersection of cultural and natural forces that meet in Phnom Penh's sewage system also produces a pressure system: not least, it is a cauldron where environmental health hazards brew.

Contrary to Anand's case, however, the issue is less to do with ensuring a clean supply than with ridding the city of dirty water. JICA's ambitious project, conducted in collaboration with the Phnom Penh Water Supply Authority (PPWSA), is a long-term effort to deal with the confluence of factors, which produces this unpleasant fluid abundance.

The Visible and the Invisible

The JICA project has multiple components. Earlier phases focused on building the Niroth sewage treatment plant, which opened in June 2013, and on building pumping stations on the Tonle Sap riverbank. Some of this work continues. Between 2012 and 2015, the project targets include the construction of more than 20 kilometres of new drainage pipes, the reconstruction of a sediment chamber, procurement of self-propelled high water-jet machines and sludge suckers to clean out pipes, and operational training. These initiatives are foreseen to lead to dramatic improvements of flooding conditions in Phnom Penh's central areas. Peak flooding, which presently rises to around 1 metre, and can remain for up to seven hours, is estimated to decrease to a peak of 20 centimetres lasting for only two hours.

'Infrastructure change of this kind is very important,' Inoue insists, 'and it must be high on JICA's agenda'. But it is also very unthankful work. Indeed, the project has been embroiled in recent controversy. For one thing, it is expensive and takes a lot of time. Furthermore, it is inherently invasive.

Sewage pipes are of course located underground: more precisely under the streets. Therefore, changing them entails digging up roads and this interrupts peoples' everyday lives. Suddenly, one cannot travel to work because of congestion and re-routing of the traffic. Suddenly, there is an open, possibly smelly, hole and heavy equipment in front of one's shop. And it might be there for a long time. While it is being improved, sewage infrastructure makes no friends. It has very little public relations value.

Even within JICA, colleagues ask Mr Inoue why they must persist. Why put up advertising signs for JICA and wave the Japanese flag in places where traffic jams and sewage stinks? Yet, the objections go beyond internal JICA discussion. Around the time of the controversial Cambodian elections held in late July 2013, the opposition drew attention to the JICA project as an example of government inability and inefficiency. Two years later, the government is pressuring for quick completion of the project to ensure that the same accusation cannot be levelled again. However, what is even worse, from the point of view of public relations and the need for visible success, is that when the holes in the ground finally disappear the project becomes invisible.

This predicament connects the STS observation that a good infrastructure is one that goes unnoticed with Brian Larkin's focus on symbolic efficacy. Certainly, JICA wants to demonstrate achievement. Indeed, it is easy to see the omnipresent project signs and posters as illustrative of the kind of infrastructural spectacle to which Larkin calls attention. Actually, however, these signs mostly call attention to the hassle that arises from the interventions. They are present wherever streets are dug up and movement through the city delayed. Whenever people are stuck in traffic, they have plenty of opportunity to notice signs advertising that this is due to a project run by JICA and Phnom Penh City Hall.

In contrast, the kind of visibility project members would really like is one that emphasizes decreases in flooding. But once such improvements happen, the signs will be long gone. Rather than showing at the street level, the kind of visibility that connects the project with decreasing water levels appears in indices, numbers and reports, which most people do not read. Project visibility is thus compromised at every turn. What should not hold attention does, whereas what should does not.

In this situation, it seems wise for an anthropology of infrastructure to stay around a bit longer, getting into view some of the activity trails that tend to remain invisible. In the case of sewage, this means looking to the ground.

Moving Materials

In order to closer to the activity trails laid out by Phnom Penh's sewage systems, I zoom in on some problems of piping. Doing so, I indicate some ways in which infrastructure, as Anand (2011: 545) puts it, might 'exceed politics' in its conventional forms (see also Jensen and Winthereik 2013: 71–93).

Phnom Penh's existing treatment plants allow for what Mr Inoue calls 'basic filtering'. He describes their function in the following way: when water enters the plants, it is pumped with air and this increases bacteria activity. Thus alerted, the bacteria proceed to consume many of the substances. Other substances are ejected: Inoue explains this process as 'basically bacteria pooping'. The substances they eject sink to the bottom of the treatment basin. Subsequently, the top level of water is flushed out in a cleaner state and the bottom residue collected.

Of course, this requires the water to reach the treatment plants in the first place. Ensuring this is difficult, however, since Phnom Penh city hall 'has no complete plans of its drainage network' (Chen & Menghun 2013); so no one is quite sure where the pipes are located. It is nevertheless certain that the network does not cover the entire city, and far from all water is treated. At the same time, many houses depend on homemade septic tanks. These tanks overflow during the rainy season, turning streets into stagnant pools in which *E. coli* and other bacteria thrive.

Meanwhile, sludge flows underneath Phnom Penh's roads, in the pipes or sometimes next to them, in open sewer channels. Composed of excrement, urine, rainwater, foodstuffs, offal, chemical compounds from medicine, insect repellent and cleaning stuff, motor oil and much else, these pipes and channels are also awash with bacterial life.

The variability of sewage flows was brought home to me during a visit to a new sediment chamber, built behind the Royal Palace. The area consists of an open stream of water, running a circular route towards a meshed gate where sediment is filtered. Sewage enters this stream from different pipes, one flow pitch black, another brownish, yet another milky white. Whereas one of these flows might constitute an environmental health hazard, another could be more or less harmless. In the sediment chamber, they combine and flow on as new mixtures.

Following the contours of Phnom Penh's geography, the sludge travels southwards. 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' (Otis 2013), it ends up in a series of marshy lakes, Boeung Trabek, Boeung Tumpun and Boeung Choeung Ek (infamous also for Khmer Rouge mass killings in the 1970s) (Bainbridge & Saroeun 2001). After filtering through these lakes, the 'gray water' eventually reaches the Tonle Bassac river.

The water in the marshes is dirty and dangerous. Even so, squatters build squalid houses at their edges. The water there is 'very nutritious', Inoue pithily notes; so 'this is where people grow morning glory, lotus, and all the other water plants used for food'.

Obviously, the problem of flooding is most pressing in the rainy season. However, in some sense, the environmental issues are less significant during this period. Because there is so much water, pollutants automatically get diluted. Indeed, much organic waste decomposes naturally even if it is flushed straight into the three rivers converging at Phnom Penh. However, since the water volume is lower in the dry season, the density of sewage is higher and it tends to get stuck in the pipes. Not reaching treatment facilities, this sludge is not cleansed. However, that does not mean the materials stay still. Instead of flowing south, they slowly evaporate and move upwards. The stench of sewage wafts across the city, engulfing shops, roads and homes.

Thus, there is an urgent need for better pumping stations to ensure flow throughout the year, and for improved treatment plants. It would be preferable to separate sewage and storm water run-off in different pipes, but it would also be a massive investment and it would take a long time, more time than either JICA or the government has. The long-term ambition certainly remains in public circulation, but given that it is up to Phnom Penh city hall to find funds, it is most likely a pipe dream in Knapp's wishful sense. Up to now, JICA, the PPWSA and the Agence Française de Développement have collaborated to build more modern treatment plants and to expand the piping networks. Even this solution is costly and time-consuming. Building the Niroth plant alone cost 90.4M$.

These descriptions suggest that Phnom Penh sewage's structure can be seen as both an object and a set of relations 'distributed over features' (Cussins 1992: 674). The features are multiple, spanning sludge, the southern slope of Phnom Penh, the cost of pipes, collaborations between international organizations, climate change, demographic reconfigurations and much else. With however many difficulties, sewage infrastructure is distributed over, but also integrates

this incongruent set. Doing so, it produces decentred activity trails that do not respect neat distinctions between nature and politics, culture and technology (cf. Schneider 2011).

Even so, it is by no means the case that such distinctions are absent on the scene. Indeed, they are central to how many involved actors view the infrastructural challenges.

Subject Registrations

Activity trails, Adrian Cussins wrote, lead to 'different registrations into subject and predicate' (1992: 681). Depending on how such trails structure activity, that is, different forms of subjects will be produced, and they will be endowed with different 'predicates' – such as being modern or backwards, responsible or irresponsible. The issue is not exclusively about classification, however, for these are processes that also materialize objects and subjects.

Obviously, infrastructure is physical. Beyond transforming the materiality of Phnom Penh's cityscape, however, infrastructures also change forms of embodiment and modes of living. Topologies of roads and modes of public transport affect the ease with which people can move through urban space, expanding or confining social spheres. Similarly, the network of underground pipes and the distribution of pumping stations influences peoples' exposure to environmental health risks affiliated with flooding. And at the markets, the city's erratic system of garbage collection converges with the underground sewage networks. The resulting activity trails shape people and their livelihoods. In the same process, they generate forms of infra-reflexivity that shape peoples' imaginative capacities for envisioning the relations between urban settings and city politics.

Holding up a map of Phnom Penh, Mr Inoue points to the Kandal market area a few blocks north of the royal palace and a bit inland from the tourist centre. 'You know this place, right,' he says, 'it is very dirty'. Thinking about the piles of garbage in these streets, it is easy to imagine sewers clogging around the market. Indeed, I have more than once found myself knee-deep in dirty water during sudden torrential downpours. I nod in agreement.

The Kandal *sangkat* (local council) complain about these recurrent floods. That is why JICA's contractor, the Japanese Sumitomo Mitsui Construction Co., needs to replace the pipes right there. Mr Inoue, however, is somewhat discontent that the *sangkat* presents the problem 'as if it was our fault'. 'Formally speaking', he insists, 'it is the responsibility of the *sangkat* to ensure that their streets are kept clean'. But, he says, no one has taken proper care of the area

for years. Hence, it is little wonder that this crowded market, full to the brim, tends to flood.

In Mr Inoue's view, the problem would diminish if people would stop throwing garbage on the streets. Only they do not. And the reason, as he sees it, is cultural. In the countryside, he has observed that people tend to clean their plates when it rains. The water naturally washes away the dirt. In the markets of Phnom Penh it is just the same, he reckons; only it happens on a much larger scale. But of course water will not naturally remove garbage from the entire market, and indeed it has nowhere to go. Instead it goes into the sewage system where it clogs the pipes and exacerbates flooding.

As Lea and Pholeros (2010: 189) have documented, aboriginal housing problems are almost always interpreted 'culturally' as issues pertaining to 'indigenous values and behaviours', 'an interpretive syndrome', they write, 'that tends to bounce off the seeming look of things into well-worn grooves of explanation and remediation'. Such explanations see aboriginal subjects as incorrigible. Mr Inoue's subject registration operates in an analogous mode.

According to this understanding, the mores of people from the countryside persist even as they move to the altogether different environment of the capital. When garbage is deposited on the streets, it is thus simply due to ingrained habits. Usually very sensitive to the complex interactions between city life and infrastructure, Mr Inoue's subtlety momentarily vanishes. Switching to a cultural register, he depicts garbage in the market streets as nothing but proof of the recalcitrance of rural city dwellers.

Faced with such explanations, Lea and Pholeros encourage us to keep following infrastructural trails. Rather than for cultural reasons, they insist that damages to aboriginal housing are mainly due to the poor quality of building materials and to 'endemic overcrowding [which] contributes to rapid wear and tear' (2010: 189). Paradoxically, it is the very visibility of this shabby *infrastructure* that makes it so easy for white Australians to register aboriginals as *culturally* primitive. Analogously we might ponder whether infrastructural location also influences the interpretation proffered by development professionals in Phnom Penh.

When Mr Inoue and his JICA colleagues intervene in Phnom Penh's infrastructure, it is one in which they have a degree of 'fluency' (Edwards 2003: 189). To a significant extent that fluency is based on professional expertise, but it is also due to practical experiences gained by living and working in the city. Yet, for the large majority of these development professionals this is a temporary condition. Generally, contracts are limited to a few years, and most

people move regularly across regions or even continents. Arriving in Cambodia from Thailand, and having stayed there for two years, for example, Mr Inoue is about to be relocated to an yet unknown destination.

This impermanence influences the relations that professionals have with the city. Invariably, it creates a certain detachment from local people and their concerns. Such distance can be nothing more than an unintended consequence of exceedingly busy working lives and the general inability of newcomers to speak Khmer. It can also be deliberate, as when people avoid seeking lasting friendships or making deep commitments due to the awareness that they will soon be on the road again. The point is that these generic circumstances influence the ways in which professionals such as Mr Inoue are able to 'register' and make sense of 'regular' Cambodian people, including those that work at the markets. Moreover, a distinctly infrastructural dimension further shapes their capacity to make these subject registrations. For development professionals also live on different activity trails than those of most locals.

Because ex-pats have much higher salaries than most other inhabitants of Phnom Penh, they tend to live in particular areas of the city, such as Boeng Keng Kang 1, where expensive serviced apartments cluster amidst fashionable restaurants, cocktail bars, embassies and international organizations. These are upscale residences with freely flowing water, exercise rooms, swimming pools and other amenities. For transport, many drive four wheelers with chauffeurs, rather than the otherwise omnipresent motos and tuk-tuks. These activity trails shape the everyday urban experiences of development professionals. These trails have been laid out in such a way that the lives of affluent, temporary foreign workers are more or less freed from hassle.

It bears emphasis that the kind infrastructural fluency of Mr Inoue and his colleagues is not *only* detrimental to their efforts at creating urban improvements. Indeed, relative detachment from the lived realities of Phnom Penh's regular inhabitants is also enabling in certain ways. For one thing, it makes it possible to imagine project designs without being totally swallowed up by the city's messy complexities.

Even so, the activity trails on, or along which, development professionals live, also facilitate a distanced perspective. Thus, as we have seen, Mr Inoue imagines flooding to be exacerbated simply because people working in market stalls fail to recognize relevant infrastructural and environmental differences between Phnom Penh's and provinces such as Prey Veng or Kandal. It is *because* they fail to recognize these differences that local people wash their hands (and their dirty plates) of responsibility, causing both flooding and collaborative

glitches. However, the situation appears quite different from a position on the activity trails of the markets.

Street Garbage

In 2004, *The Phnom Penh Post* characterized garbage collection as 'a major headache' and 'a constant challenge for the Municipality of Phnom Penh (MPP) and its sole garbage collection contractor, CINTRI' (Wood 2004). Ten years later, the system remains dysfunctional. On its webpage, this Australian company insists that: 'Keeping the streets of Phnom Penh clean and collecting the waste of city are not easy tasks' (http://www.cintri.com.kh). According to public versions, problems with fee collection, originally sought solved by adding them to electricity bills (cf. von Schnitzler 2008), led CINTRI to the brink of bankruptcy. In contrast, critics believe that CINTRI generates significant revenue, since salaries are minimal and the costs of garbage removal very low. However, since the contract with Phnom Penh City Hall is undisclosed, no one can know for sure, and thus it is impossible to hold the company to account for its poor service.

CINTRI's garbage collection system, too, instantiates a particular activity trail. At markets such as Kandal, this trail intersects with the badly maintained sewage infrastructure with consequences that become especially palpable during the rainy season. Rainy afternoons at the market can be seen as events that make particularly visible the micro-social, micro-political and micro-material consequences of these intersecting trails.

Several times per week during the rainy season, dark clouds gather on the horizon and move rapidly toward Phnom Penh. At Kandal market, people peer towards the sky as they continue their business. Soon after, it begins dripping, then raining harder. As moto drivers don rainwear and people hurry inside, market vendors move their goods to relative safety under the tarpaulin roofs of their stalls. Minutes later the downpour is torrential.

Water rises steadily on street 13, until motos and cars reluctantly have to give up driving. At this point, kids come out to play, laughing as they jump around in brown water that reaches up to their thighs. The few cars that attempt to aquaplane their way down the street create waves that splash into the stalls. As the water recedes, it draws garbage back into the street, which is now more like a stream. Under their covers, vendors, knee-deep in water, continue to cook on open fires. Gradually, the rain stops, the sun reappears and the water level starts sinking. Some hours later as evening approaches, street 13 is almost dry. People sweep their stalls. Some carefully bundle the garbage and put it by the

roadside. Others simply pile it up. At night, thin, worn-looking men pulling carts walk the streets to collect garbage.

As we have seen, Mr Inoue separates the issue of sewage (his responsibility) from that of garbage (the responsibility of the *sangkat*). Whereas sewage pipes, in this view, are an infrastructural issue, the problem of garbage that clogs the pipes is given the form of cultural habitus. At Kandal market, however, it is impossible to imagine that problems of sewage and garbage are separate, for there these activity trails intersect with the most tangible consequences. More-over, it is similarly difficult to imagine the problem of clogged drains as predo-minantly cultural. Not only is there nothing particularly cultural about the fact that vendors cannot prevent rainstorms from flooding their stalls and washing garbage into the street. There is also nothing deeply cultural about the fact that even if they were to carefully wrap this garbage, as some do, Cintri would still not remove it with any regularity.

At the market, garbage collection practices thus encounter the sewage network and abundant rainwater to make up what we might call a total infra-structural fact. These converging activity trails shape the concrete rhythms and practicalities of peoples' lives. They also have more oblique consequences, such as the not precisely known long-term health outcomes of working in wet, dirty conditions. Finally, this total infrastructural fact also functions as the infra-reflexive backdrop to peoples' conceptions of what life at the market is like, and what causes it to be like that.

Lea and Pholeros write that 'as sewer pipes struggle to carry away waste-water', infrastructure turns into a 'pipeline or conduit for myths [and] rumours' (2010: 207). This description is quite apt in the case of Phnom Penh's sewage infrastructure, for out of its clogged pipes flow not only water but also interpretations. In contrast with my own argument, however, these interpretations do not focus on the convergence of activity trails. Instead the views of street vendors on infrastructure centre on political indifference and malfeasance.

Much like the different flows of sludge that mix indiscriminately at the sedi-ment chamber, these interpretive flows also combine heterogeneous things. Thus, street vendors' stories lump together corrupt, power-hungry politicians, foreign garbage collecting companies and JICA's sewage project. Rather than wishful pipe dreams, these narrative flows resemble Knapp's 'bogie rumours' characterized by their 'dour and pessimistic quality' (1944: 24). They are evinced in unceasing complaints to JICA, to newspaper journalists, and to visi-

tors like me, that nobody cares about the problems of sewage, flooding and garbage collection at the markets.

Note that I am arguing neither that Mr Inoue and JICA nor the street vendors and Kandal *sangkat* are *either* right or wrong about their mutual opposed interpretations, critiques and complaints. Instead, I have endeavoured to show that their very (and varied) capacities for making such 'registrations' *are shaped by the particularities of the infrastructural activity trails they inhabit.*

Converging Trails

Infrastructures are 'things', as Larkin (2013: 329) wrote, that also create the possibilities for encounters between worlds (they are 'relations between things', he added). Shaping activity trails that, in turn, form different kinds of subject and object positions, sewage infrastructures can be seen as experiments that produce materialized, practical ontologies (Jensen 2015). Although it cannot be assumed that activity trails always converge, they often intersect: like at Kandal market, where lines of sewage and garbage meet. With the issue of such partial convergence in mind, I return to the gravel at the junction of Siha-nouk and Monivong Boulevards. What does this scene teach about Phnom Penh's intersecting activity trails and emergent practical ontologies?

Mr Inoue draws for me. Here is a road with buildings on each side. It is narrow, like most streets of Phnom Penh. Underneath run the dirty, badly main-tained pipes of the Soviet era. However, since no one is sure about the precise location of these pipes, the extension of the network entails an on-going detec-tive work. Furthermore, underground one can never be quite sure where build-ings end and streets begin. Buildings often do not adhere to regulation, so bits and pieces of them may jut out under the road. Add to this that the under-ground is full of dodgy electric wiring and illegal connections to the existing drains.

On top of the road drawn by Mr Inoue people live, shop and travel. His problem is how to intervene in this environment, which is equally overcrowded at the surface level and beneath, though by different actors. Environmentally and hygienically, it would be preferable to install two pipes, but this is at once expensive and time consuming. However, laying single pipes have one particular benefit: being narrower they require opening only one side of the street. Contractors are thus able to always leave space on the side of the streets, just wide enough for agile moto drivers to wriggle through.

To further minimize adverse impacts, the JICA project has adopted a strategy of continuous movement. Thus, roads are opened up for no more than 50

metres at a time. Because these stretches are relatively short, pipes can quickly be checked, repaired or replaced, making it possible to close the holes and re-open street sections in a matter of days. In this way, it is supposed, people will have had little time to become seriously affected and annoyed.

Sometimes work on a particularly busy street, or one that requires a lot of work, is abandoned completely for a period of time. After having been left in peace for a while, machines return and the digging resumes. Thus, one month after I had first documented the gravel at the busy intersection of Sihanouk and Monivong Boulevards, the machinery came back to finish its job (Figure 2).

Considered in narrow technical or logistical terms, this movement back and forth is far from ideal. However, from the point of view of making activity trails partially converge, or at least preventing their mutual disruption, the strategy makes sense. It exhibits recognition that what matters is not the success of one activity trail at the cost of others, but rather achievement of relative coherence between them.

Yet this coherence remains emphatically relative. As the process of continuous movement invariably delays project implementation, JICA faces charges of incompetence and inefficiency. Such critiques come from critical journalists and opposition politicians as well as from market vendors too.

Figure 2. *Laying pipes. Intersection of Sihanouk and Monivong Blvds. Photo taken by author.*

Infra-reflexive Dreams

Infrastructures shape not only Phnom Penh's urban arrangements but also the subjects that inhabit the city. Every day, activity trails modulate the bodies of people and things in myriad ways. The patterns emerging from these ongoing modulations generate the relative sense of coherence or incoherence of urban infrastructure. Generated by the intersection, divergence or convergence of activity trails, these modulating infrastructural patterns instantiate practical ontologies. Because such patterns exceed human intentions and motivations, they have an inherently experimental dimension: no one will be able to predict, and hardly even retrospectively explain, precisely how or why they (came to) shape the people and the city in just this way. But more is at stake than the modulation of material patterns, for peoples' imaginative capacities for registering subjects and objects also modulate. Thus, as I have argued, the ways in which JICA officers and market vendors are able to know culture and politics is consequent upon the infrastructural arrangements they inhabit.

Ethnographies focusing on the politics and poetics of infrastructure often argue that materials such as pipes may function as potent symbols even when they remain buried in the ground. The dirty materialism of Lea and Pholeros does the point in reverse: since it is not certain that visible pipes are actually pipes, infrastructural spectacle might really refer to nothing of any material consequence. The latter position directs us from an understanding of pipe dreams as political or cultural imaginaries akin to 'wish rumours', to an infra-reflexive view of pipe dreams emanating out of material arrangements. These pipe dreams are materially shaped by the activity trails that run underneath the ground on which Phnom Penh's inhabitants walk, drive and live.

There is nothing particularly psychological about them. Even so we might find in the psyche an apt point of comparison; for, after all, the sub-conscious also generates its effects through operations that normally go unnoticed. And thus follows another transformation: If, as Lea and Pholeros argue, highly visible Australian pipes may not be quite real, it is also possible that Cambodian pipes can have real effects irrespective of whether the people they affect think so. This is about pipe dreams in an infra-reflexive, decentred, sense. Even if people at Kandal market rarely think about pipes, and even if their dreams, interpretations and critiques are *about* something else (like culture and politics), the capacity for having those dreams is consequent upon infrastructural activity trails.

When it comes to Phnom Penh's infrastructure, it is thus no longer clear where the material ends and the imaginative begins or, indeed, if the distinction

makes any sense. Testifying to the decentred qualities of infrastructures, pipe dreams precipitate from actual pipes, spilling over into human lives, dreams, fantasies and aspirations. Within these practical ontologies, the dreams of people certainly shape the bodies of pipes. Simultaneously, however, surreptitiously and silently, pipes also shape peoples' bodies and dreams.

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