Lively Infrastructure

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Abstract

This paper examines the social life and sociality of urban infrastructure. Drawing on a case study of land occupations and informal settlements in the city of Belo Horizonte in Brazil, where the staples of life such as water, electricity, shelter and sanitation are co-constructed by the poor, the paper argues that infrastructures – visible and invisible – are deeply implicated in not only the making and unmaking of individual lives, but also in the experience of community, solidarity and struggle for recognition. Infrastructure is proposed as a gathering force and political intermediary of considerable significance in shaping the rights of the poor to the city and their capacity to claim the rights.

Keywords: Occupations, Favelas, Infrastructure, Rights to the City, Sociality, Solidarity

Introduction

We are seeing the rise of a new genre of thinking that narrates the social life of a city through its material infrastructure. In it, trunk networks, the built environment, and public utilities and services appear not only as subjects of interest in their own right, but also as matter implicated in the making of urban functionality, sociality and identity. Of course, disciplines such as architecture, urban design and engineering, and systems science have long thought of cities in these terms, displaying varying degrees of interest in the nature of the relationship between the material and the social. Sometimes the infrastructures have been seen as provisioning systems, sometimes as emblems of futurity, sometimes as designs of social being, occasioning diverse kinds of positive or negative commentary from social scientists on how the human is imagined as adjunct to the material (see, for example, Mumford, 1938; Park, 1952; Sennett, 1994 on the modern American metropolis).

The new social science writing, in contrast, tends to see the material and cultural as hyphenated, each closely implicated in, and part of, the other. Accordingly, both the social and the technological are imagined as hybrids of human and nonhuman association, with infrastructure conceptualised as a sociotechnical assemblage, and urban social life as never reducible to the purely human alone. There is nothing a-social, mechanistic or reductionist about how this writing imagines infrastructure, thus providing an interesting opportunity to reimagine the city as both a social and a technical arrangement. In this paper, I focus on the insight offered by the new infrastructural turn in making sense of human being and sociality in the city, in ways that acknowledge the liveliness of socio-technical systems, and this, even in the places of infrastructural absence or failure. Indeed, my exploration of human prospects and identities in the city is based in an analysis of the agency of the absences and presences of the very basics of urban provisioning such as water, electricity, sanitation, and low-cost housing in the slums and un-serviced outskirts occupied by the poor in the city of Belo Horizonte in Brazil.

The new thinking reimagines the urban social in three significant ways. First, in approaching the city as a provisioning machine, it shows how the socio-technicalities regulating the distribution of staples such as food, water, electricity, sanitation, healthcare, information and knowledge centrally determine the character of urban wellbeing and sustainability (Graham and Marvin, 2001; Heynen, Kaika and Swyngedouw, 2006). Typically, it reveals how some cities are let down by failed, incomplete or mismanaged infrastructures, forever patched up by improvised measures that most tax the poor (Pieterse and Hyman, 2014; Jaglin, 2014; de Boeck, 2013; Graham, 2010; Humphrey, 2003); and conversely, how other cities manage to stave off the unforeseen complications of complex provisioning systems by building in excess capacity, circuit breaks, and intelligence and slack within and across the city's infrastructural networks (Lahoud, 2010; Vale and Campanella, 2005; Batty, 2013). Importantly, this writing shows that there is nothing purely technical or mechanical about even the most digitised infrastructures, revealed instead as complexes of socio-technical alignment and allocation composed of corporate interests, regulatory standards, social expectations, hybrids of human-software-hardware intelligence, and historical legacies of organisation and supply (Greenfield, 2013; Kitchin and Dodge, 2011; Halpern et al, 2013). The urban infrastructures are shown to be social in every respect.

This includes, secondly, their symbolic power and their social selectiveness. The new writing revives a longer tradition interested in the affective and aesthetic qualities of the urban infrastructure, showing, for example, how public sentiments of progress, modernity and wellbeing become attached to iconic buildings, highways, or new housing and shopping complexes, regardless of their functionality and material impact (Harvey and Knox, 2012, Manton, 2013). The literature illustrates how the hopes and ideals sustained and the promises glimpsed, render the incomplete and often unfulfilling present bearable, and how the emblematic material makes for an imagined commons of shared affects and assets supposed to iron out the divisions and differences of the everyday city. Yet, ironically, these differences and divisions are also scripted into the workings of infrastructure: the rules and tariffs of supply, the socio-spatial decisions of providers, the selectivity scripted into software calculations of allocation (such that 'pipes turn out to be documents' (Larkin, 2013: 335), the sharp differences of access between the rich and the poor and the constant battle between them over public goods (Graham, McFarlane and Desai, 2012). To render visible the detail of urban infrastructure would be to reveal precisely these imbalances. To follow Saskia Sassen's (2012: 74) suggestion that 'all the major infrastructures in a city – from sewage to electricity and broadband - should be encased in transparent walls and floors at certain crossroads, such as bus stops or public squares', would be to not only disclose their centrality to urban metabolism but also their unequal distribution, amplifying the freight of her conclusion that if 'you can see it all, you can get engaged' (*ibid*.).

Thirdly, and most innovatively, the new writing shows how infrastructures – visible and invisible, grand and prosaic - are implicated in the human experience of the city and in shaping social identities (Tonkiss, 2013). Some of this work alludes to particular habits such as improvisation or opportunism and to particular affects such as endurance or anger when residents are challenged by urban utilities and services not working or being inaccessible, while other work shows how the good life and cultural practices of those able to enjoy access are designated by the urban infrastructure (Simone, 2004; McFarlane, 2011; Sundaram, 2010; Amin, 2013a). Other work concentrates more directly on infrastructure as aesthesis (Larkin, 2013), that is, as a sensory landscape that both extends and works on human being and sociality in its dwelling. Here, the circulation of sights, smells, sounds and signs, or the assemblage of buildings, technologies, objects and goods are seen to shape social behaviour as well as affective and ethical dispositions (Amin, 2014, de Boeck, 2012; Hirschkind, 2006;

Shepard 2011; Rhys-Taylor, 2013). How the habitat and its inhabitation extend the boundaries of the human is insightfully illustrated, eschewing any notion of a clear human interior and a separate environmental exterior. Thoughts and feelings, along with social dispositions, appear as formed in the interactions of the sentient body and a sentient landscape with varying degrees of intelligence incorporated in its infrastructures (Thrift, 2014; Mackenzie, 2010).

These reorientations script the city and its inhabitants in novel ways, as they do infrastructure itself, now imagined as socio-technical process with diverse agentive powers (Harvey, 2012). The result is the birth of an exciting anthropology of infrastructure that foregrounds the urban backstage to reveal the sociality of roads, pipes, cables, broadband, code and classification and the enrolments of the socio-technical systems that they are part of, and which make the modern city the machine that it is, however efficient (c.f. Mahvunga, 2013; Tousignant, 2013; Larkin, 2004; Elyachar, 2010). As Brian Larkin (2013) argues in an important essay on infrastructure as politics and poetics, the kind of work summarised above cautions against taking urban infrastructures for granted, and if anything, prompts effort to understand 'how (in)visibility is mobilized and why' (p.336).

In this paper, I take up Larkin's invitation to consider the poetics and politics of infrastructural visibility and invisibility by focusing on the struggle in poor informal urban settlements over staples generally available to the better-off elsewhere in a city. I am interested especially in the social power of infrastructural visibility – when the poor and their advocates organise to build or procure services in new sites of settlement, with the effort dominating landscape, labour and sociality – and in the affordances of infrastructural invisibility – when connectivity to the municipal mains for water, electricity, sanitation and transport is eventually secured, momentarily hiding the trials and technologies of procurement.

My material is drawn from Belo Horizonte in Brazil, where I spent three weeks in August and September 2013 studying three organized land occupations by the poor, and also the favela of Nossa Senhora de Fátima, one of four favelas that make up the city's largest and oldest informal settlement - Aglomerado da Serra – that houses 50,000 people, and where it has taken some 40 years for trunk infrastructures to become part of the invisible background of supply. In the occupations, the visibility of infrastructure in the making has been crucial in the

construction of place, community, sociality and political claim, while in the favela, the invisibility of provisioning from trunk infrastructures has allowed Nossa Senhora de Fátima's residents to hesitantly lead fuller lives and exercise their citizenship. Both visibility and invisibility turn out to be equally productive in different ways.

Infrastructure Visible

Eliana Silva, Rosa Leão and Dandara, all named after heroines of past popular struggle, are three of the handful of occupations that have sprung up on the outskirts of Belo Horizonte in the last four years (figure 1). They echo a long and fraught history of urban settlement by illegal occupation by migrants and the poor in Brazil, tacitly accepted by the authorities as a form of bottom-up urbanisation involving minimal demands on the public purse, but always resolutely and often violently opposed by landowners, speculators, planners, municipalities, elites and a judiciary in denial of facilitative laws (Holston, 2008; McCann, 2014; Fischer, 2014). Each occupation involves between 300 and 1,300 poor families - homeless or living in crowded conditions or struggling to meet rent payments – that have taken the bold step to build concrete and brick homes, public spaces, and diverse infrastructures on disused private or public land, knowing that they could be evicted at any time, and before that, harangued by their opponents.

The occupation process has not involved a slow drip of individual families following the lead of others, taking what they want, building how they wish, and relying on their own initiative alone. Instead, the occupations have been organised, led by pro-poor housing movements such as the Brigadas Popolares (BP) or the Movimento de Luta nos Bairros, Vilas e Favelas (MLB), university architects, lawyers and planners, diverse social justice organisations, and representatives elected by the families. The selection of the site and its plots and the timing of the occupation is coordinated and the ambition of the leaders and advisers is to stop the occupations from becoming slums by designing in orderly settlement and compliance with urban planning guidelines right from the start. Each occupation has followed a settlement design drawn by the professionals and activists in consultation with the families. The designs outline standardised plot sizes, protected green areas, risky inclines to be avoided, sanitation and waste disposal procedures, water and electricity sources, street lay-out and

architecture, and shared spaces such as community centres, crèches, play areas, churches, and allotments.

The aim is to build a neighbourhood that meets standard planning and legal requirements, and a community that is more than the sum of its individual plots and lives. Typically, after months of negotiation over the details of the settlement plan between the families, their representatives, and the architects and social activists, an occupation rapidly unfolds. In the time between dodging eviction during a period of days when the police can intervene on grounds of criminal infringement, and period of months peppered with acts of harassment when claims and counterclaims are judicially reviewed, there follows a flurry of building activity in the hope that the authorities will be persuaded to recognise the merits of an orderly process of neighbourhood formation and organisation. The flimsy shelters made of wood and plastic sheeting are turned into single or double storey brick and cement houses, the roads and sanitation pits are built, the supply of water and electricity is made secure, the commercial ventures are established, the places in nearby schools, workplaces and health centres are sought out, and work on diverse shared spaces, from churches to communal kitchens and toilets, is commenced. On a barren stretch of land on the far outskirts of the city, but close to mains water and electricity supply, the new occupants invest a vast amount of labour, money, materials, hope, hardship and goodwill in full knowledge that all could be lost in a sweep, that violation will be met with violence.

Counter to their wholesale negative characterisation by the authorities and the middle classes, the occupations tell a story of remarkable human achievement in the most adverse circumstances. On the ground, we find people without means risking everything to exercise a formally recognised right to shelter, enduring all manner of deprivation and uncertainty to build something out of nothing on unstable or contaminated terrain. We discover the extraordinary skills and imagination applied to turn hastily built shacks into concrete and brick homes in a matter of months. We encounter the commitment of people with pressing personal needs and worries working with neighbours to pirate water and electricity for the settlement and to build streets, crèches, churches, and other communal facilities. We see the forbearance involved in building a home, travelling long distances to shop, find work, seek education and health care, participating in meetings and events to secure rights, setting up commercial ventures in the backyard, exchanging favours, meeting basic needs in

rudimentary conditions, and facing multiple risks and uncertainties. We see how in the midst of all of this time is found for building associational life, friendships, neighbourly relations, a local commons. We encounter the dedication of the professional experts, activists and community coordinators prepared to work for free for month on end to transform the occupation into a decent urban settlement.

But the story of settlement, including the above socialities, can also be told in a different way, as a *mise en scene* by infrastructure. Nothing is more striking than the visibility and sound of housing, sanitation, water and electricity, streets and landscapes in the making. The unfolding infrastructure is the object of attention, the frame of values and affects, the grid of neighbourhood, and the matter of wellbeing, sociality and struggle. It commandeers the settlement process, including the lives, concerns and affects of the settlers, as the three examples below of infrastructural performativity at different stages of the life of an occupation illustrate.

Infra-designation

All three occupations have been instantiated in quite significant ways by otherwise mundane models designed by architects of the Praxis Group at the Federal University of Minas Gerais (UFMG) who work on social housing and also with the poor on self-build projects (Morado Nascimento, 2012). The three-dimensional latex models, the size of a small table (Figure 2), are continuously altered in their detail in the course of discussion with the residents and their leaders over the accurate number of occupying households, the size of individual plots, and the scope for shared ownership (generally opposed by the residents). Eagerly awaited as the signal to commence building after days and weeks of living in only a corner of the settlement and under flimsy structures, the models visualise the green areas that should be protected, the contours and geology of the landscape of safe build, the location and arrangement of individual plots, the lay out of streets, services and communal spaces, and the total space and aesthetic of the settlement.

The agency of these rather makeshift models has been immense. First, they have mapped the community to come and its modus operandi. They have signalled an orderly occupation right from the start, and in turn directed the unfolding developments as well as correct most errant departures. In visualising the whole

settlement and individual fit within it, residents have come to see and agree the total number and lay out of the plots to be allocated, the spaces to be avoided, the occupants who need to be moved, the green areas and creeks to be protected, the shared and communal facilities to be built, the fairness of the standard plot sizes selected. Much of this has been actively debated, and sometimes it has been contested by residents or ignored by the self-centred household, but the overall power of social designation of the models has remained intact.

Secondly, the models have played an important pedagogic and mobilising function. The collaboration between the architects, activists and residents in designing the settlement, has nudged the future inhabitants and their representatives towards becoming knowledgeable interlocutors and collective actors. Long and protracted discussions over the design of the occupation have tapped into and valorised the lay expertise of the residents, taught the community leaders to hone their negotiation skills, brought into the open unacceptable opportunist or rogue behaviour, placed the private within a frame of collective interest and need, and strengthened community knowledge and power in dealing with the authorities. Around the models has emerged a sense of place, community, and belonging, guiding development, shaping social awareness, mediating negotiations, and unlocking expertise.

Thirdly, the models act as a call to order. They can be quickly forgotten when the frenzy of individual pursuit digs in, when the leadership is tested by waning community interest or the infringements of criminals and drug-traffickers, when the incursions of the authorities or powerful intermediaries threaten agreed plans, and when the architects and activists have receded into the background. Their durability is by no means guaranteed, but they do survive as a powerful – and often only - mnemonic of the originally negotiated settlement, helping leaders and early settlers to bring developments back into line, remind the community of a design intended to benefit everyone as well as improve the chances of formal recognition from the authorities, and mobilise against damaging new infringements. The models trace the line between the planned and unplanned informal settlement (see Valadares, 2006 for the history of categorization of Brazilian favelas).

Infra-being

It is a line that is easily blurred and quickly forgotten once the labour of building homes, utilities and the neighbourhood gets under way, along with the trials of securing a living, the right to stay, and safe survival. Yet this is precisely when the visibility of the infrastructures of place emerge as the primary metonym of place, commanding daily attention and shaping social orientation and affect. The social force of infrastructure is unmistakable, crystallised around the documents designating 'ownership' of a plot, the bricks, corrugated metal and plastic tanks assembled for the houses, the poles, wires and tubes put into place to pirate water and electricity, the spaces cleared for play areas, churches, roads and toilet blocs, and the vehicles, mobile phones and televisions facilitating contact with the outside world (figure 3). These objects, and the cares, skills and chains of possibility they gather, dominate the spatial and social landscape of the emerging settlement.

Within the individual household, this agency is manifest in the attention given to, and commanded by, building a house piece by piece when time and resource allow, the measures taken to pirate water and electricity, build sanitary pits, and make indoor or outdoor showers and kitchens, making a house into a home by decorating and furnishing rooms, travelling long distances to secure earnings and to buy goods, negotiating access to faraway schools, clinics and other welfare services, and seeing to the daily denials, disruptions and repairs caused by infrastructural improvisation. This is a process of infrastructural crafting that mixes the 'thrill' of home ownership, the satisfaction of artisanal accomplishment, and the satisfaction of working with others with the anxieties of exposure to the natural elements or to criminal or police violence, the dangers of live wires causing fires and sanitation pits flowing over, and the worries of securing the wellbeing of the family. So many cares, feelings and dispositions are arraigned through infrastructural interactions.

Then, beyond the household, lie the reminders of incomplete or makeshift infrastructures: the low-hanging electric wires everywhere that could so easily fall or snap, the unfinished roads and tracks throwing up dust or becoming quagmires in the rain, the cracks in the ground opened up by the elements and the rivulets formed by unmanaged grey water, the seepage from badly constructed sanitation pits, and the trash that gathers in untended spaces. The infrastructure-formed aesthetic is not all bad, for as and when the settlement becomes more diverse and organised, into the aesthetic are incorporated the hoardings advertising commercial products or religious opportunities, the

greenness of protected areas, planted trees and shrubs, and tended private gardens and community farms, and the orderliness of maintained communal spaces such as play areas, crèches and community centres.

These hyper-visible and constantly evolving infrastructural developments make the atmosphere of place that forms the precognitive of mental, sensory and affective dispositions: the residents' experience of living in the settlement, their feelings and obligations towards each other, their attachment and responsibility towards shared public spaces, their expectations from the commons (which range from environmental disregard and cohabitation with the makeshift to hyper-cleanliness within the private compound and participating in improving communal spaces).

Infra-commoning

How the communal landscape looks, and how it is curated and spoken of, turns out to be quite significant in shaping sociality. Five years since the Dandara occupation in 2009 (figure 4), the resonance between collective culture and the aesthetic of place is under strain, despite the efforts of community leaders to cleave to collectively agreed rules, keep public spaces free from encroachment, and raise environmental awareness. Many of the settlement's open spaces gather rubbish and look unkempt, its uneven roads are crossed by rivulets of grey water gathering in smelly pools, the poorly designed sanitation pits in every home threaten to spill over, and some households have broken the agreement to keep every plot size standard by extending their properties. Only some exceptions stand out, albeit with considerable symbolic power as a mnemonic of collective possibility. One is the community farm that grows fruit, vegetables and herbs for sale and also for distribution to Dandara's poorest families, but is a veritable oasis only because the energetic and experienced elderly woman tending it had to get rid of all the collectivist malingerers to make it into a going concern. Another is a large and beautifully decorated church built from donations and the skills and care of Dandara's residents and is cherished by the settlement's large Catholic community. A third is the community centre, used for meetings but also as a library and classroom bringing much needed learning opportunities to Dandara's children.

My impression, however, is that such exceptions – taken forward by a small number of community leaders and activists - will not stop the general drift

towards an under-curated public landscape. The state of neglect is likely to get worse as private interests increasingly come to the fore in this neighbourhood of 1,200 households, as the first phase of coming together in order to sustain the occupation, map the territory and acquire individual plots gives way to a second phase of living the neighbourhood as an individuated homely space. This is a sociality reinforced by the aesthetic of the landscape and continuing spatial differentiation, and it presses heavily on a leadership harried by the multiple demands of a large settlement, its constant negotiations with the authorities for recognition, the growing counter-power of drug traffickers, and the personal burden on individuals to earn an income, build a home, and maintain a family at the same time as working for the community. There is an intricate play between the infrastructural aesthetic, social praxis and collective organisation shaping the culture of the commons.

In contrast, the condition and culture of the commons is very different in Eliana Silva, which houses only 300 families, is still in its early stages of build since occupation in 2012, and is led by a widely respected and charismatic MLB activist who decided to built his own home in the heart of the settlement. Here, work on communal projects has moved in pace with that on individual homes, thanks to the commitment of the coordinators, active residents and external advisers and volunteers to implement original plans for shared space right from the outset. There are numerous initiatives, some completed, some on going, and others planned (figure 5). They include making sure that solid waste is deposited in appropriate places, securing lighting for the main streets, encouraging families to channel grey water into areas of soft earth, preserving and adding vegetation in open spaces, building an airy community crèche/centre, maintaining a protective rim around fresh water streams, involving many people in the community farm, planning a ceramics workshop that will make house signs keeping the block of public toilets and washbasins clean, getting households to co-own and build a market-tested low-cost sanitation pit topped with water-absorbing plants ('Tevap'), and preventing the subdivision of a property or its sale for at least four years and granting rights over only the building and not the plot.

It is hard to predict whether in the fullness of time, the culture of the commons will go in the same direction as that in Dandara. It might do if the strength of leadership and community involvement weakens or if private interests come to displace collective ones. On the other hand, the very aesthetic and functionality

of a working commons – the obstinacy of infrastructure shared – might help to maintain the collective ethos; acting as a reminder of services and spaces that are valued, summoning civic participation and care for the commons, and materially merging the private and the public. The materials, coalitions and visual iconography involved in making commoning both ordinary and necessary could ensure a different future for Eliana Silva.

It is unclear how the reciprocities of infrastructure and sociality will play out in Rosa Leão, the most recent of the three occupations, initiated in early 2013. This is a large occupation involving 1,300 families spread out across an undulating hillside whose topography does not lend itself to easy visualisation by the community of the whole. The occupation is highly controversial as it is on land within the last green belt north of Belo Horizonte, which has been designated by the authorities for formal housing expansion. At the time of my visit in September 2013, many wood and plastic sheeting constructions had already sprung up, serviced by pirated electricity and water, and work had begun on the main roads. But the settlement design and plot allocations had yet to be finalised, as the architects awaited the final head count and the outcome of difficult negotiations between a recently formed and fragile leadership and an expectant community that the size of the land available for safe and planning-sensitive build would necessitate halving anticipated individual plot sizes.

Though Rosa Leão began as a spontaneous occupation, it soon drew in MLB activists, university experts and other advocates of the poor (e.g. from liberation theology) to help map and design the settlement, guide plot allocation, designate public spaces, identify risky terrains, and protect environmentally sensitive areas. Like the other occupations, the signs of common orientation and collective organisation right from the start are unmistakeable, manifest in the strength of MLB and BP presence, the planned designation of private, public and shared spaces, the frequent meetings between activists, advisers and residents to engender a culture of knowledge sharing and co-responsibility, the charisma and force of its leading spokesman Father Gilvander Luis Moreira, the murals and hoardings calling for solidarity, the success in relocating families that had moved into environmentally sensitive areas, the enthusiasm and commitment of the community representatives, and the willingness of occupiers to help build trunk infrastructures and to come to the aid of the most vulnerable.

Such early signs, which were also evident in Dandara's early days, could easily unravel. Already, they have been put to the test by the loud threats of eviction from and the violent confrontations with the authorities owing to the occupation's sensitive location, by an inexperienced leadership being ignored by the residents or opposed by rogue builders on unallocated land and drug traffickers with other interests in mind, and by the rush of the occupiers to build a home amidst the fear of being allocated a smaller than expected plot. Against these pressures, it is not clear whether the practices of commoning will stick in the way they have for Eliana Silva: the topography gets in the way of making the whole settlement and its shared spaces visible to all, while the mnemonics of pooled interdependence remains scant and fragile, leaving almost everything to the vicissitudes of effective leadership and community goodwill.

Infrastructure Invisible

In Nossa Senhora de Fátima, four decades after the first illegal occupation of the slopes of the mountain that closes in on the city, the days of thinking, feeling and living through the improved urban infrastructure are largely over for its 10,000 inhabitants (figure 6). The houses and streets have mains water, electricity, and sewage connectivity, the roads are paved (and recently also the many paths that cross the steep inclines) and lined with commercial activity and traffic, the constantly extended and divided houses are densely packed together, rented, sold, and much sought after for their close proximity to the city centre, there are banks, restaurants, civic associations, schools and health centres in the neighbourhood, and the balance between living safely and sociably and facing police violence and drug criminality is tipping slowly towards the former. By law, Nossa Senhora de Fátimamay be an informal settlement, but like so many of Brazil's urban favelas, it is in all other respects a thriving, well-functioning and organised city neighbourhood, built by the poor, recognised and serviced by the authorities, and increasingly attracting the gaze of tourists and gentrifiers. Like in other favelas of Brazil, the distinction between the legal and illegal, the formal and informal, and urban incorporation and exclusion is blurred.

Nossa Senhora de Fátima's transition from rudimentary occupation to serviced neighbourhood has been long and taxing, and like elsewhere, full of conflicts, openings and closures, even during the quarter century of democracy since military rule with fluctuating political and institutional commitment to the poor (McCann, 2014; Perlman, 2010). The transition is the product of years of self-

organisation and social reciprocity, and of arduous civic mobilisation – at times overshadowed by profiteering, criminal or clientelist interests - for land, housing and service rights. The long process of informal urbanisation tolerated by the authorities has eventually led to municipal upgrading of the favela's trunk infrastructures and connectivity to the city's water, electricity, sanitation, and transport system, along with better access to diverse social services. The proliferation of building and the vigorous trade of property – still without formal title deeds - has created a robust and complicated housing market of owned and rented dwellings. In Nossa Senhora de Fátima, the social prominence of the infrastructure has receded into the background of silent provisioning, even if the frustrations of regular and affordable supply of services continue to persist.

If infrastructure retains its role as a social mnemonic, it is as a reminder of days in the recent past of manifest lack, the daily labour of carrying water and securing other services, and working with each other to make the favela habitable. In the making invisible of infrastructure, however, it is not as though the sociality and social life of the material of provisioning has diminished. It has simply changed, and largely for the better. For Nossa Senhora de Fátima's residents, having access to secure housing, mains water, electricity, sanitation, and transport connectivity has allowed them to lead fuller lives and to campaign for other basic needs such as better education, healthcare, and community protection (both from the police and drug gangs), and to participate more fully in the life of the city. The step is an significant accomplishment, one where finally some things can be taken for granted after years of self-reliance and struggle over the right to pubic goods taken for granted by the better-off elsewhere in the city, without which they would not be who they are, and the city reduced to dysfunctional chaos. In Nossa Senhora de Fátima, the concealment of the liveliness of infrastructure has been about the grind of daily procurement of certain staples being absorbed by the 'skunkworks' of public supply in the modern city (Goldstein, 2009; Amin, 2013b).

The accomplishment, however, is double-edged, and certainly no neutralisation of a politics of pubic provisioning stacked up against the urban poor. In Nossa Senhora de Fátima, and other favelas that have benefitted from municipal upgrading in Belo Horizonte and in other cities of Brazil, the cost of becoming part of the urban commons is never far from the surface (Guimarães, 1992). It includes the long wait for only partial and conditional access, the irritations of having to pay for erratic supply and suffer poor quality infrastructure, and with

further upgrading, the threat of displacement as land and property values rise and the better-off move in, and the indignity of not being allowed to shape new developments. This has become all too evident in the latest round of modernisation.

At the heart of the new developments is the Vila Viva programme funded and coordinated by the city's Urban and Housing Development Company (URBEL). In resonance with the early Lula administration's interest in bolstering the rights of the poor and improving conditions in favelas, Vila Viva was launched in 2005 to upgrade the city's high risk and poor areas ('zones of special social interest') by building new housing and making infrastructural and environmental (Inclusive Cities Laboratory, 2010). In Aglomerado da Serra, the programme has seen work on some 850 new apartments by late 2013, many more demolitions and evictions from sites considered as environmentally risky or needed for infrastructural projects, and a set of communal interventions including social centres, green spaces, new trunk roads, paved pathways, and the linkage of houses to mains sanitation (figure 7).

If the programme has provided permanent new homes to some residents and introduced new services and spaces, the return of infrastructural visibility comes with distinctly new connotations. The new housing, for example, consists of clusters of standardised four-storey blocks painted in different colours to break the monotony. They are set apart from and tower above the densely packed low-rise Favela houses of varying shape, size and colour. While they house, at no cost of purchase, families moved out of land deemed environmentally risky or required for the new trunk road cutting through the Aglomerado, others less fortunate have been forced to fend for themselves after being evicted (less than half of the 13,000 evicted families in Belo Horizonte have been rehoused). Then, if the 40-45 square meter apartments are comfortable and well serviced, the residents - used to building, adjusting and improvising – have not been allowed to make any alterations or hang out washing, and there is no space for social interaction for the people who have grown up in the permeability between the private and the public, in the narrow stairwells and landings peppered with plants to make them look more human or in the tight space outside between the blocks and the perimeter wall. It is as though the favela aesthetic and vernacular of living has been deliberately silenced by design, deemed anomalous.

So, too, with the new and unusually wide large trunk road that snakes up the hill and cuts through the Aglomerado, with its high banks and few exits, separating Nossa Senhora de Fátima from the other favelas. The road is a scar on the landscape, one that has taken out many more dwellings than necessary, created open spaces such as roundabouts and verges that are useless or a nuisance, and has barely any favela traffic on it. Contested, undesired, and costing a vast amount of money that could have been used in more beneficial ways within the favelas, the highway is an imposition that makes sense only as an intervention designed to shorten the commute of middle class drivers from the city's gated communities and suburbs into the centre of Belo Horizonte, to make circulation in the city easier during the World Cup and other big events. There are no smiling children standing on the verge waving at the shiny fast cars, no favela vehicles pouring onto it to take advantage of opportunities elsewhere, no Nossa Senhora de Fátima's residents walking across to the other favelas. It is hard not to think of the highway – and the new housing - as a step towards making a prime location ready for gentrification, erasing the markings of a neighbourhood built by the skill and ingenuity of the poor (see Jacques, 2013 on aesthetic conflicts in favelas).

The 'environmental' interventions of Vila Viva are equally suspect. The steep river gullies running down the Serra, along which precarious but imaginatively built houses once perched, and which displayed many tended gardens, pathways, and domestic or farm animals, have been fenced off by Vila Viva. Designated environmentally risky or sensitive areas, the slopes of the gullies have become a wasteland, left to ruin, overgrow, collect dumped material and hide the activities of those who do not wish to be seen, peppered with ruined buildings, fruit trees and cultivated perennials as forlorn reminders of the past. Risky but managed nature has become unkempt and unused, with no one the better off for this. The planners of Vila Viva did not bother to ask those who lived along the gullies how their dwellings could be made more secure, how the landscape could be better managed, how the slopes could be stabilised. Once again, local knowledge and vernacular were dismissed, indeed not even acknowledged, prompting the thought that the new wild areas with ruins from the past will one day provide a pleasant historical surrounds for the new villas to come and today a warning to residents of the shape of things to come.

These are the impositions of design dumped from above, without any regard for the knowledge, preferences and lifestyles of the people who made the favela

liveable. They have made infrastructure – in the form of a highway, H-blocks and protected spaces - starkly visible and central again (at the same time as adding to the invisible infrastructure of supply by providing mains sanitation). This time, however, visibility has less to do with the making of life and community by the poor themselves, than with the management of change in the name of urban social cohesion by disarming the local vernacular and all that it has provided (figure 8). The authorities, in this allegedly pro-poor intervention, could have consulted widely with the residents of Nossa Senhora de Fátima and involved them in design and decision making, respected the land use pattern and aesthetic, and merged the modern and traditional in sensitive ways. But this would be to assume no ulterior motives, no judgements of social worth, and no desire for a different kind of place. In Nossa Senhora de Fátima, the short moment of the infrastructure becoming invisible in helpful ways for the favela has been overcast by the shadow of a new visibility of mixed promise.

Conclusion

The machinations of Vila Viva are a timely reminder of how closely the destiny of the poor and the space of their affective, social and political orientations is governed by the policies and actions of ruling elites and institutions. In this regard, the traditional politics of power manifest in legal, governmental, corporate, bureaucratic, and associational rules and practices have to be kept squarely in the frame. Vila Viva, and countless other past slum 'upgrading' programmes, disclose the developments and consequences initiated by the acts of instituted force: the designs of the powerful, the influence of elites, the rules and repetitions of law and bureaucracy, the decisions of political leaders, the pushes of the advocates and adversaries of the poor. Not much can be said about the social life of poor neighbourhoods without an understanding of these forms of institutional authoring and their interplay.

The complex and variegated dynamic of this play is all too evident in urban Brazil, even during the short two decades of pro-poor Left rule after the overthrow of military dictatorship, waxing and waning over neoliberal reforms displacing the poor. Democratization, as James Holston (2008) argues, has produced a discourse of universal rights and citizenship, laws to recognise the property claims of the poor, and provisions to recognise the occupation of unused land for social need. Practice, however, has been highly differentiated in its social and spatial distributions owing to the persistence of discriminatory

legacies, institutional inconsistencies and voids, and unimplemented or distorted constitutional commitments, but which has also unleashed acts of independent and insurgent citizenship among the urban working class and poor to acquire land, housing and services. These acts, in turn, have been violently opposed by the discontents of direct democracy in the judiciary, police, central and municipal government, and criminal and client networks thriving off poverty. Yet, it remains the case that in Brazil the vast majority of housing for the poor is delivered via autoconstruction, legitimated by official recognition of purchased land claims, and sometimes of the act of occupation.

The fortunes of the poor living in informal urban settlements, thus, are conditioned by at least three sets of institutional force: first, the disjuncture between the courts, political reforms, municipal authorities, and property owners or intermediaries relating to the rights of the occupants over land, property and services; secondly, the dispositions of regional and municipal leaders during different political cycles towards occupations, favelas and the needs of their residents, which can make a considerable difference to the benefits acquired (McCann, 2014); and thirdly, the balance of power in a neighbourhood between clientelist patronage, community organisation, involvement of NGOs and religious and social movements, criminal interests and the incursions of municipal authorities, regulating the potential for change. This is the foreground of favela politics, the arena of organised battle over the shades of wellbeing and abjection (Biehl, 2013).

But, for the poor without means living in places of rudimentary provisioning, this is a battle over the staples of life, with questions of infrastructure right at the heart of struggle, individual and collective. The jostles of instituted force focus around the imperfect machinery of supply. As Holston observes (2008: 8), 'the city is not merely the context of citizenship struggles. Its wraps of asphalt, concrete, and stucco, its infrastructure of electricity and plumbing also provide the substance. The peripheries constitute the space of city builders and their pioneering citizenship', to which we can add also the battles launched by opponents to make the infrastructure work for counter-interests. Yet, as I hope the examples in this paper have illustrated, the liveliness of infrastructure involves more than its character as the object of community struggle, in the form of mundane socio-technicalities that are fundamental in shaping wellbeing, sociality, and organisation, and in ways that often inflect the politics of the 'foreground' in unexpected ways.

Though no substitute for political economy, ethnographies of material culture can help to reveal added matter for a politics of social recognition and justice; matter that might prove to me more than marginal. If cities are socio-technical allocation machines worked through the silent placements of diverse infrastructures, from water grids and public parks to schools and coding systems, they qualify the agency of human subjects and authorities in at least three ways: firstly, as less than supreme, secondly as incorporated in the machinic, and thirdly as dependent on the latter. This goes for all cities, regardless of their technical intensity, sophistication and spread, for even the most rudimentary, improvised and broken systems, as this paper has tried to show, are full of agency and meaning. Uncovered, the urban infrastructure turns out to be not only as active as any community or institution, but also the medium through which much of the latter is orchestrated.

This is another way of saying that though a politics of titles, pipes, bricks and pits may not appear as muscular or heroic as a politics of citizenship and power, it may in the short run help to meet the staple needs of urban majorities, and in the long run, enlarge the ground of the political in ways that not only allow subaltern interests to be pursued beyond established procedures biased towards the few, but also reduce the pre-eminence of the latter by adding more modes of organisation and action into the political arena (Amin and Thrift, 2013). To return to Nossa Senhora de Fátima, the impositions of Vila Viva show that the subaltern cannot afford to give up on the politics of community organisation, activist campaigning, municipal recognition, and party mobilisation. To do so is to let the authorities get away with impositions that jar, to ignore the right of the poor to demand citizenship and justice in a so-called democracy. Equally, the history of Nossa Senhora de Fátima and that now unfolding in Dandara, Eliana Silva and Rosa Leão, makes it amply clear that the right to the city is also a matter of claim through occupation, self-organisation, infrastructural improvisation, and counter-vernaculars of inhabitation and design (Caldeira, 2012). This is the ground of making life liveable, the city a plural ontology, and power more decentred, with much of this given collective orientation through joint effort in securing everyday infrastructure.

It is also the ground of speaking truth to power in an indirect way. In an ideal world, the citizens of a city or nation committed to universal wellbeing should expect the minima of survival to be made available through the state, the

constitution, or legal address. But this is manifestly not the case in many democracies, for a host of reasons preventing the delivery of large-scale wellbeing. The gap between paper and real democracy remains large, and if anything it is widening today as the centrifugal tendencies of neoliberalism daily oust the centripetal aspirations of social democracy. Nothing much is likely to change until the disenfranchised organise to claim their right, and with effective force, for what the recent experience of urban occupation and clamour for social justice around the world has shown is that any tangible reforms won have been overshadowed by the assault of organised power to crush the movements or to manipulate them for new patterns of centralised return. Captured by elites, and barely used by the organised Left to further a politics of social transformation, neither representative nor direct democracy is delivering to the poor in straightforward ways. A restored activism can make for a provisioning invisibility because it presses on the state and other providers to deliver basic services as public goods. The state has to be brought in, perhaps dragged in by the scruff of the neck.

In this far from permissive context, the making of micro-collectives by the poor around shared infrastructures (and other material of the urban commons) may be a necessary political opening. Occupation, and the co-construction of a habitable space through all kinds of infrastructural improvisation and innovation, has brought together people from different backgrounds into common endeavour, discover the value of collective life by having something to work on collectively, use infrastructure to address the larger city for rights and connections, as AbdouMaliq Simone has so persuasively shown in his work on Southern vernacular urbanism (most recently by the excluded middle classes in Jakarta – Simone, 2014). Most importantly, many though not all the occupations are appropriations designed to live the city in another way - collectively, frugally, autonomously, creatively (Vasudevan, 2014). None of this is easy work, the rewards are often insubstantial, and the politics of community is fraught with contradictions and conflicts. It would be a mistake to romanticize occupation and informality as a new dawn. However, in the making of the city along new lines – perhaps even for a fleeting moment – a new possible world emerges, new solidarities are formed, and the right of the disenfranchised to claim the city is claimed, exercised, and shown to be possible. The city is a site of multiple formations and social transformation is made visible, spur to those with the power to change society for the better to act, if only they had the conviction and

commitment. Wishfully we might speculate that occupation is a kick-start to the remaking of the just society.

Acknowledgements

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