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Animating the urban: an ethological and geographical conversation

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ABSTRACT

Urban animals and their political ecologies constitute an arena of geographical scholarship that has intensified in recent years. Yet, little headway has been made in terms of understanding how sentient creatures inhabit and negotiate dynamic, metabolic environments. Focusing on urban macaques in Indian cities, the paper develops a conversation between geography and ethology. Firstly, the conversation provides insights into what urbanisation might entail for animals. Secondly, it assays ways in which non-human knowledges enable rethinking what expertise counts in urban governance. Thirdly, the conversation foregrounds other spatial topologies of the urban that become evident when animals' lifeworlds are taken into account. The paper advances efforts to animate urban political ecology in registers yet inattentive to non-human lifeworlds. It concludes by reflecting upon the purchase of such etho-geographical conversations generate for political ecologies of urbanisation.

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Animating the urban

Urban animals and their concomitant political ecologies constitute an area of geographical scholarship that is at the cusp of gaining significant traction. A decade ago, geographers commented that the urban was somewhat in the margins of vitalist and material geographies, and that much more needed to be done to understand how 'nonhuman life continuously circulates in and through its spaces' (Braun, 2005, p. 646). This need for engagement with the living world in urbanisation studies was also echoed by early animal geographies, on the grounds that it would lead to a re-imagination of urban theory 'from the perspective of its meaning for animal life' (Wolch, 2002, p. 735). In a similar, but not necessarily sympathetic vein, political ecologists argued for attending to urbanisation as a process of socio-ecological transformation, brought about through particular discursive, political and economic productions of novel natures (Gandy, 2015; Swyngedouw, 2006). Incorporating ecology, particularly animal life, into urbanisation studies is indeed the *zeitgeist* of the times, heralded by calls from cultural geographers and political ecologists alike.

Since these iterations, a select body of scholarship on urban animals and the political ecologies of urbanisation have emerged. Urban theory has been animated through questions about animal identity in urban contexts (Hovorka, 2008; Thomson, 2007), socio-spatial practices of animal inclusion and exclusion from cities (Palmer, 2003; Power, 2009), their entry and circulation as materials and commodities (Barua, 2014b; Cresswell, 2014; Emel & Neo, 2015), and as subjects of control, conflict and controversy when animals flourish in the urban polis (Ginn, 2013; Hinchliffe, Kearnes, Degen, & Whatmore, 2005; McKiernan & Instone, 2015; Yeo & Neo, 2010). Although non-human animals are now very much a part of urban scholarship, galvanised by animal geography and associated strands of political ecology, a central aspect of early calls for animating the urban still remain neglected. Little has been done to elicit understandings of what urbanisation might entail and mean for animals themselves (Wolch, West, & Gaines, 1995). Consequently, much of the above scholarship emphasise 'animal spaces' (Philo & Wilbert, 2000), or how *human practices* order animal life in cities with specific social and political effects (Hovorka, 2017). This has come at the expense of *animals'* geographies and their 'beastly places' (Philo & Wilbert, 2000), particularly how sentient creatures negotiate and learn to inhabit complex, dynamic environments, apprehending them according to their own knowledges, speeds and rhythms, with or against the grain of urban design.

Part of this lacuna is, however, methodological. In a now seldom-quoted argument, Yi-Fu Tuan, a pioneer of early animal geographies, suggested that 'the ideal education for a humanistic geographer' ought to include 'background knowledge of physical geography, animal ethology and concepts in the social sciences', as 'facts from these fields are for him a point of departure and reminder of the many constraints that impersonal forces place on man [*sic*]'. 'From ethology', Tuan argued, geographers learn 'techniques of observation' (Tuan, 1976, p. 274). Despite this prescient observation, geographers have seldom conducted ethno-ethological work that involves in-depth engagements with specific animal populations or individuals and their lifeworlds (Buller, 2014).¹ Furthermore, collaborative work with ethologists has been scant. As a result, human geographers, adept at '(dis)assembling society, ... are not on par when it comes to decomposing nature', thereby falling short in terms of providing thick histories and political ecologies of 'the heterogeneous relations that ... exist in the world' (Lulka, 2009, p. 386).

To this end, this paper, co-authored by a human geographer and an ethologist, develops in the form of a conversation to formulate insights into three aspects of animals' urban political ecologies: urbanisation, knowledges and space. We work with this form—a conversation or dialogue—as ours is not so much an endeavour of beginning with a pre-given consensus, but one of constructing and inventing problems in relation to what is at stake (Deleuze & Parnet, 2007). Human geographers' recent engagements with non-humans have, in part, been sparked by moves to go beyond human exceptionalism, reworking the topologies of wildlife by attending to spaces of embodiment, motion and relation (Whatmore, 1999). Ethology, on the other hand, is 'the biological study of behaviour' (Tinbergen, 1963, p. 411), an inductive enquiry into patterns of animal behaviour under natural conditions. Epistemological and ontological commitments of human geographers and ethologists can differ (Seymour & Wolch, 2010). The former have more often been concerned with uneven, stratifying dynamics of power emerging from, and reproduced through people's relations with animals, be they to do with gender (Emel, 1995), class (Howell, 2015) or capital (Barua, 2014b). Ethologists' study of behaviour patterns primarily emphasise their functions,

causation, ontogeny and evolutionary history (Lehner, 1998). Mapping these back onto notions of the social, cultural or political is not their primary concern. There is thus a lack of pre-given common problems, and hence integration and synthesis do not happen by default (Barry & Born, 2013). A conversation for us, then, is an inventive starting point: eliciting what ethological perspectives do to geographers' attempts at decomposing urban natures and front-staging their political import; conversely, it is about pursuing ethological work on animals in dynamic, anthropogenic contexts differently, when subjected to geographers' understandings of socio-political drivers of urbanisation. Whilst a difficult endeavour, haunted by epistemological contrasts and disciplinary constraints, an etho-geographical conversation has much to offer up for rethinking more-than-human life in cities.

We articulate the dynamics of animals' urbanisation, knowledges and space by focusing on the transformative experiences that urban, peri-urban and wild, traditionally forest macaques appear to undergo in modern-day, rapidly urbanising India. Macaques are candidates par excellence for understanding the urbanisation of non-human worlds. With approximately 22 species distributed principally across eastern and southern Asia, macaques represent, arguably, the most adaptable and evolutionarily successful of all non-human primates. Several macaque species, also referred to as 'weed macaques' (Richard, Goldstein, & Dewar, 1989), exhibit an inherent tendency to gravitate towards human habitations, thus, setting in motion an inexorable process of urbanisation of their lifeworlds. Two such Indian species are the rhesus macaque *Macaca mulatta* in the northern parts of the country and the bonnet macaque *Macaca radiata*, endemic to peninsular India. Truly 'wild' bonnet macaque populations are rarely reported in recent times, across the species distribution range, whilst semi-urbanised populations are increasingly coming into conflict with human communities, largely over crop- and kitchen raiding. About 500,000-odd rhesus macaques populate northern and northeastern India, of which about approximately 55% live in or around human habitations (Malik, 2001). Consequently, they now constitute a major urban governance issue, challenging cartographies of urban planning and the pulse of everyday life in cities across the subcontinent.

One of us (AS) has studied the demography, social dynamics, life-history strategies, individual behavioural traits and cultural traditions of several bonnet macaque populations for over 24 years now, documenting differences in behavioural repertoires and practices across populations, social groups and individuals (Huffman & Sinha, 2011; Ram, Venkatachalam, & Sinha, 2003; Sinha & Mukhopadhyay, 2013; Sinha, 2005; Sinha, Mukhopadhyay, Datta-Roy, & Ram, 2005). The other, a geographer (MB), has been examining the governance of non-human life in Indian cities, focusing on how macaques become entangled in a range of urban controversies, from contestations over space to concerns over public health. The ethological and geographical conversation that we embark upon here has less to do with the merging of the epistemological differences between these disciplines but more with a dialogue sparked by the *abductive* qualities of macaques as *they* make us track diverse terrains, embodied practices and urban topologies. Our respective disciplinary concerns with macaque lifeworlds prompt this encounter: a conversation where each is provoked to 'speak *with*, write *with*' or enter into 'agreements ... between bodies of all kinds' (Deleuze & Parnet, 2007, p. 39). We recognise that what emerges is integrative at times, where the movements of ethology and geography are smooth, and antiphonal at others, shuttling back and forth, remaining distinct. Rather than ironing out differences, however, we seek to work with unions

and tensions generatively, for 'shared conversations in epistemology' is a difficult labour, partial in its endeavour and never truly finished (Haraway, 1991, p. 191).

The paper is thus structured as follows. Section II focuses on processes of urbanisation, tracking how metabolisation results in transformation of macaques' lifeworlds. By metabolisation we are not so much referring to its deployment in industrial ecology, developed by the Vienna School (Newell & Cousins, 2014), but to a series of interconnected, dynamic and uneven processes that transform and re-arrange humans and non-humans in new, and often unexpected, ways (Gandy, 2015; Erik Swyngedouw, 2006). In Section III, we map into macaque knowledges, examining how they matter to working practices and controversies of governing the urban. Section IV attends to macaque spaces, interrogating how productions of space and urban mobility might be re-conceptualised when animal movements and territorialisations are foregrounded. These three aspects of macaque lifeworlds provide important insights for animating the urban. They orient understandings of what urbanisation might entail for animals themselves (Wolch, 2002), enable rethinking of what knowledges and expertise matter in governing cities, and foreground other topologies of the urban than those posited simply by state control and human design (Hinchliffe & Whatmore, 2006). Taken together, they help overcome some of the humanist biases of animal geography and political ecology. Finally, the conclusion of our discussion briefly reflects upon some of the opportunities that etho-geographical explorations offer up for political ecologies of urbanisation and the challenges that remain for future development.

Urbanisation: metabolism and history

When embarking on a long-term study of a wild bonnet macaque population in the deciduous forests of the Bandipur and Mudumalai National Parks in southern India in 2000, one of us (AS) made a surprising discovery: more than half of the observed troops were characterised by unimale–multifemale formations, consisting of a single adult male, a few adult females and their dependent young (Sinha & Mukhopadhyay, 2013; Sinha et al., 2005). This was radically different from earlier demographic studies conducted on the same population in the 1980s, which primarily reported multimale–multifemale troops, the social formation that this species typically resides in across its distribution range. These relatively 'new' unimale troops, which appear to have evolved recently following extensive provisioning by tourists visiting the sanctuaries, are significantly smaller than the typical multimale groups, with more biased, but stable, adult male-to-female sex ratios (Sinha et al., 2005). The key driver of such novel social formations, which have appeared, we believe, essentially as a result of a process of *urbanisation* of a wild non-human population, thus, seems to be the nutritionally rich but spatio-temporally clustered, human-provisioned food, newly available to the macaques. Provisioning also intensified intra- and inter-troop competition, particularly accentuated when natural food resources were sparse or patchily distributed, particularly during the annual dry season (Sinha & Mukhopadhyay, 2013).

Understanding the urbanisation process as a process of *urbanising nature* has been one of political ecology's pressing concerns. Viewed as a transformative *process* of socially mobilising, economically incorporating and physically metabolising nature to support urbanisation (Swyngedouw & Kaika, 2014, p. 462–463), there is much emphasis on how urbanisation processes are producing local and global environments in new and consequential ways. Yet, barring appearances here and there 'as static stock of 'things' that are necessarily mobilised

in the urbanization process' (Braun, 2005, p. 645), there is little insight on how commodification or metabolisation affects and alters the sentient experiences of animals. The changes in structural organisation of macaque troops, reflected in the above example, is one register through which one can glean how non-human lifeworlds get urbanised through occasionally novel metabolic flows.

Here, a conversation with geographers, attending to different cultures of provisioning for urban animals, the 'commodity stories' of production and consumption that trail them (Bakker & Bridge, 2006), complement ethological inquiry. References to macaques living in urban commons in southern India date back to at least 2000 years (Sinha, 2001). Across India, we find the feeding of macaques to be a common practice. Perceived to be living incarnations of the Hindu deity Hanumān, providing for monkeys is considered an auspicious act, even in instances where they cause considerable damage to property and agriculture. Several macaque populations across the country, therefore, are regularly provisioned with fruits and other food commodities, an activity identified by biologists as one of the reasons why macaque numbers have increased so significantly in urban India (Southwick & Siddiqi, 1994). Dissecting the biographies of provisioned food commodities and the properties, meanings and emotions associated with their circulation across time and space is thus vital to developing geographies of the urbanisation of nature.

We argue that such an endeavour entails going beyond the resolute humanism in which commodity stories have been cast (Barua, 2016, 2017). Much of this work has focused on processes of production and accumulation from the vantage point of the human. Animals tend to enter the fray only as recalcitrant or obdurate beings that challenge or stall such processes (Bakker, 2010). Ethological work, on the other hand, shows that macaques are able to distinguish between provisioned and natural foods, a distinction that is not along a humanist axis of calibration but configured by things being drawn into relations fostered by the macaques' own activities (von Uexküll, 1982). Studies suggest, for example, that macaques might be vital participants in the political economies of temples (Schlotterhausen, 1992, 1998), through diverse bodily labours of consuming offerings from pilgrims—sentient encounters that lend to the construction of sacred narratives and performed behaviours evoking empathy and care (Fuentes, 2007). Macaques are also known to take away objects from pilgrims that have no direct food value and then appear to use these as tokens by returning them to people in exchange for food. Provisioning here is, thus, akin to 'a process of commodity-exchange (or bartering), within which macaques play an active role' (Brotcorne et al., 2017, p. 2). A geographical and ethological conversation indeed brings *other* commodity stories to the fore, one attentive to what commodities might mean to the animals themselves, *their* practices of consumption and how *they* might affect commodity circulation and afterlives.

Provisioning, we argue, also alters macaques' corporeal dispositions. Our fieldwork in cities shows that several individuals are 'obese' as a result of feeding regularly on 'junk' food including packaged food, crisps and soda. Diets with high sugar levels can lead to diabetes in monkeys, a condition generally associated with urban human lifestyles (Shively, Register, & Clarkson, 2009). Primates in other urban contexts have also been shown to have significantly higher body masses than rural counterparts, as well as a 38% higher level of cholesterol (Gruber, 2016). These preliminary observations allow us to understand the transformative role of urban metabolism, the changes they bring about in the bodies and health of non-human animals.

A second register through which we might understand what urbanisation might entail for animals themselves pertain to dramatic changes in their behavioural repertoires and profiles in altered ecologies. Scavenging and foraging on provisioned food, with their concomitant human interactions, severely enhance aggression among often closely related females in the typically female-bonded bonnet macaque societies. There is often a significant increase in contact aggression, rare under conditions of natural foraging, particularly directed by subordinate individuals towards more dominant females. The reciprocation of aggression by subordinate females that also appears in these circumstances is accompanied by a decline in allogrooming and other affiliative behaviour. The transition from natural foraging to a provisioned ecological regime, in fact, results in linear dominance hierarchies being challenged, with social formations becoming relatively unstable (Ram, Venkatachalam, & Sinha, 2003).

Furthermore, the anthropogenically driven generation of unimale troops through provisioning, referred to above, is also accompanied by striking behavioural differences between single adult males of the novel formations and the comparably most dominant 'alpha' males of multimale troops (Sinha & Mukhopadhyay, 2013). In multimale troops, adult males are remarkably tolerant of the reproductive efforts of other males whilst, in contrast, those of unimale groups reproductively monopolise females, resulting in strong intolerance of other males—adult, subadult or juvenile—both within and outside their troop. Such interactions have never been reported in multimale configurations, where aggression is less intense or rarely unidirectional (Sinha et al., 2005). Ethological and geographical perspectives, when brought together, thus, generate much richer understandings of the urbanisation of nature, not just in ecological terms, but in phenomenological registers as well. New ways to think about what urbanisation might entail for the entourage of non-human beings that compose our cities today are thus prised open.

The third register, through which effects of urbanisation are evident in macaque lifeworlds, involves what we might refer to as long-term individual life-history strategies (Sinha & Mukhopadhyay, 2013). The severe aggression displayed by resident males of provisioned unimale troops is accompanied by a herding of females, an activity that intensifies when other macaque troops are present and never observed in multimale bonnet macaque groups. Resident males also defend the troops during inter-troop encounters, physically interacting with males of other troops, sometimes inflicting grievous injuries on them. Dominant males in multimale troops, in contrast, virtually never participate in inter-troop encounters but, accompanied by troop females, observe such interactions from a distance. Moreover, unlike their counterparts in multimale societies, adult males of unimale troops actively prevent immigration of other males into their troop (Sinha et al., 2005). These observations have significant import on how the urban 'animal' might be dissected. It moves beyond collectives such as species that has characterised much animal geography (Bear, 2011), highlighting instead the impacts and more subtle influences that urbanisation has on lived experiences of individuals, in turn promoting collective differences between the different social configurations.

Social differences between bonnet macaque troops are further indexed by increased group fission that accompanies urbanisation. Females of all ages occasionally leave natal troops, either singly or in associations, a phenomenon otherwise rare in this philopatric, female-bonded species that typically live their lives together in the natal troop. We contend that such emigration, a novel female life-history strategy for this species, might have arisen

not only because of efforts to reduce social tension generated in the group as a result of human provisioning but also due to a lack of mate choice for females confined to unimale social organisations (Sinha & Mukhopadhyay, 2013). Yet, the effects and experiences of dispersal are borne by particular individuals, manifesting ultimately in their lifetime choices. Individuals who move once, for example, are likely to do so again although such movements, usually alone, increase survival risks due to predation. Urbanisation, and the consequent entanglement with metabolic pathways of provisioned food, which are, at once, denser and more extended than are non-urban ones, could thus lead to particular cultures of movement in macaques. An ethological and geographical conversation in such a context not only sheds light on animals' encounters with humans, but also generates a different sense of their lives beyond such encounters. Furthermore, conventional understandings of what constitutes an 'urban animal' are challenged, for the appellation is opened up to varying degrees of difference that are not the same everywhere.

If urbanisation, as we have argued, is a process transforming macaque worlds, then questions about *animals' histories* of urbanisation must come to the fore. Material and historical geographies of urbanisation often presuppose humans, transcended from the natural world, as sole historical agents. The 'making of history' is then largely considered an outcome of particular relations of production, their concomitant practices of intervening in, inscribing upon and shaping up natures, which are inert and, in some ways, lacking in history. Yet, it is evident that humans and animals inhabit the same immanent world and their mutual encounters are meaningful, not just for the people but for the macaques as well. We thus, concur with Ingold when he states that 'just as much as humans have a history of their relations with animals, so also animals have a history of their relations with humans' (Ingold, 2011, p. 61). Whilst only humans construct *narratives* of this history, working with those who are 'with' animals can offer us some of the best possible indications of how such narratives may *alternatively* be told.

Some of the behavioural similarities observed in populations across commensal species such as the bonnet macaque could, in fact, emerge from their shared histories of living with humans. Across the Indian subcontinent, for example, certain urban troops of both macaques and langurs might be more aggressive than are others of their same species, regardless of their species-typical behavioural predispositions, especially if their encounters with humans have continually involved persecution. Similarly, populations express differential behaviours in regions where there have been histories of provisioning, as opposed to where they are not exposed to such urbanised resources. In shared environments, therefore, skills, knowledge and expertise may cut across porous bodies and human–non-human divides. The proposal, to cite a notable example, that tool use in certain wild chimpanzee populations was a cultural adaptation and product of observational learning from human communities (Kortlandt, 1986) provokes one to think of what macaques might have learnt from humans and the ways in which these are manifested in their histories of urban life. Pursuing such lines of inquiry is likely to generate great dividends, not just for recasting the historical geographic ambit of urban political ecology but also for the very practice of ethology concerned with non-human learning, knowledges and cultures.

Knowledges: politics and urban governance

If an etho-geographical conversation opens up differential understandings of what urbanisation entails for animals themselves, it also contributes to rethinking what forms of knowledge and expertise matter in the governance of cities. The latter was at the heart of Steve Hinchliffe and colleagues' call to 'ecologize politics' such that the vibrant potential of things, materials and animal lifeworlds could be accounted for in working practices of the urban (Hinchliffe et al., 2005). Three dimensions of their prescient argument, voiced over a decade ago, warrant closer attention. The first pertains to challenging majoritarianism, which treats political subjects as emerging fully formed in the public realm, ready and able to form alliances or tolerate others. Thus, they shun representational practices of rendering animals into ready-mades, either 'found' or 'made' through acts of translation, but without any 'knowledgeability' of the urban or capacity for directing action. The second concerns front-staging non-human knowledges as a means to engage with urban 'matters of debate', where animals get entangled in issues, creating both conflict and assent. Third, they call for new modes of encounters with non-humans that enable other knowledges to be articulated so as to unsettle the straightjacket of representational politics. Thinking with macaques, we argue, puts in place a more *ecological* politics of governing the urban.

Despite the widespread reception of these ideas in human geography, little progress seems to have been made subsequently in terms of eliciting animals' knowledges and unravelling how they are at work in configuring the micropolitics of urban life. This, in part, stems from the paucity in long-term understandings of how animals learn, emulate and innovate when inhabiting complex urban environments (Sinha & Vijayakrishnan, 2017). Much of animals' actions, their capacities for recalcitrance and ability to challenge human affairs are explained away in human geography by notions of non-human agency, understood as 'an achievement that is temporarily gained through interaction within a heterogeneous assemblage of other nonhumans all of which have agency potentials' (J. Lorimer, 2007, p. 913). Debates on what constitutes agency aside (Ingold, 2013), we need better appreciations of why animals act in particular ways and to elicit the modalities through which they learn particular behaviours. Here, ethologists' engagements with animals' motivations, mechanisms of learning and formation of cultural traditions have critical import, as they can pave the way to forge new modes of encounters—front-staging specificities of non-human knowledge—and unravelling how they matter to urban governance.

Before proceeding to articulate how such insights enable a differential understanding of urban governance, a few key points regarding how ethologists contextualise macaques' knowledge needs iteration. There is consensus that social primates, in general, appear to be knowledgeable about one another's behaviour to different extents. More importantly, recent work demonstrates that macaques seem capable of forming mental representations, generated by direct personal experience, and this capacity apparently underlies our study species', the bonnet macaque's interactions with both the mechanical as well as the social components of her immediate environment (Sinha, 2003). This suggests a rather early evolutionary origin for fairly sophisticated cognitive capabilities, characterised by an objectified self with limited regulatory control over more subjective levels of self-awareness in cercopithecine primates, to which macaques belong (Sinha, 2014). Another challenging question is whether they recognise the beliefs or, more generally, the mental states of other individuals (Sinha, 2003). Current ethological thinking holds that certain higher primates may be

perceptually conscious, but are possibly not reflectively so. Part of the bias against the belief that primates can indeed reflect on their thoughts is, however, methodological—animals cannot ‘tell’ us what they are aware of, but this applies theoretically only if language is considered the sole register of reliable communication. Certain cognitive philosophers, therefore, consider all living entities to be intentional beings and attempt to unravel different levels of intentionality in their behavioural performance, in order to grapple with the limitation of linguistic incompatibility (Cheney & Seyfarth, 1990; Dennett, 1971, 1996).

Macaques, ethologists opine, seem to be capable of second-order intentionality, whereby an individual appears to have some beliefs about the beliefs of others and behaves in particular ways as if it wants *others* to believe in something (Sinha, 2003). This differs substantially from beings of zero-order or first-order intentionality, wherein they, respectively, either have no belief systems whatsoever or do not recognise others to have beliefs; as also from beings, such as humans, who are able to make others believe in their own personal beliefs (third-order intentionality). Whilst, there is a clear hierarchy of cognitive complexity in these orders and a potential cause of argument with human geographers and social scientists, who do not necessarily privilege one mode of intent as more desirable than another (Whatmore, 1997), or see intent to precede action (Ingold, 2013; Latour, 1999), the critical message is that macaques seem to be *aware* of social relationships maintained by themselves and by other members of their troops. Much of their behaviour within any socio-ecological milieu, therefore, stem from such awareness or, more specifically, knowledges of intra-troop dominance relationships, social attractiveness of particular individuals and of affiliative relations among individuals not necessarily involving themselves (Sinha, 1998).

Intent and referentiality is also possibly at work when macaques communicate with one another through gestures or vocalisations (Deshpande et al., *in press*; Gupta & Sinha, 2016). Recent studies indicate novel, intentional and referential communication strategies, involving both gestures and vocalisation, when macaques establish functional links with people, as when they ‘beg’ for food from humans in urbanised contexts (Deshpande et al., *in press*). Moreover, macaques appear capable of attributing motives to others and taking on another’s visual perspective, thereby perhaps being able to perceive the world from the other’s point of view (Sinha, 2003). Bonnet macaques are also known to deploy tactical deception to possibly generate false beliefs in a conspecific audience, an activity done under numerous social contexts including competition for mates, food and allogrooming partners. Such communication is complex, involving concealment, distraction, suppression of personal interests or motivations, display of displacement behaviour and even deflection of an individual’s attention to a third party. Our long-term ethological studies also show there is significant individual variation in the display of such acts, with particular individuals apparently having a greater propensity as well as an ability to do so.

We argue that animals’ knowledges, an immanent mode of knowing enacted from within, rather than upon, the world (Ingold, 2000), have significant import for urban ‘matters of debate’. Macaques, particularly the rhesus macaque but also the bonnet macaque, to a smaller extent, poses problems in urban spaces due to their proclivity to enter houses and damage property. The former has thus been labelled ‘simian terrorists’ in the popular media of northern India, particularly as they raid kitchens, stalls and street vendors, sometimes grievously injuring people in the process (Radhakrishna & Sinha, 2011). The death of New Delhi’s mayor, following a rhesus monkey attack a few years ago, brought macaques to the forefront of the capital’s urban governance and planning issues (Williams, 2007). News media

storylines of 'monkeys running amuck', 'creating havoc' or 'invading Parliament' became, and continue to be, all too common.

The 'monkey menace' is not only viewed to taint New Delhi's national capital image, but, more recently, a major barrier to the current government's cleanliness and sanitisation campaign launched in October 2014 (Marcin, 2015). The city registers over 1800 monkey bites annually (Anon, 2015), posing health concerns as monkeys are susceptible to rabies and their bites necessitate post-exposure prophylaxis. It is not just the city's municipal corporation but also the bureaucracy and even the judiciary that have now become entangled in the issue. Attempted interventions range from capture and relocation, with over 19000 macaques purportedly trapped in the last decade, to the hiring of trained langur individuals to wards off rhesus macaque troops from residential areas (Gandhi, 2012). Such interventions, largely driven by expert design, have however been of little avail. Capture and relocation is a contentious issue, facing severe opposition from animal rights groups, ecologists and behavioural biologists (including one of us, AS), and even partisan right-wing Hindu political outfits that have threatened to release pigs in mosques if 'sacred monkeys' are taken away (Dogra & Phatarphekar, 2004).

If geographical perspectives point to the representational politics of the 'matters of fact' surrounding human-macaque conflict (Yeo & Neo, 2010), ethological perspectives foreground 'matters of concern', of *other* conditions that render these debates visible (Latour, 2004). The multitude of skills, acts and attachments performed by urban macaques, indeed, matter to the state apparatus and bureaucracies that seek to control them. One dimension pertains to social or individual learning and behavioural or cultural traditions (Sinha, 2005)—the learning and passing on of behaviours between sometimes closely related individual macaques, by vertical, horizontal or oblique transmission, ultimately leading to the establishment of traditions that those behaviours generate. Although there could be different modes or mechanisms through which learning occurs, the three most commonly recognised are imitation, when individuals learn by mimicking one another and which is believed to require sophisticated cognitive abilities; emulation, when the *affordances* of particular tools or other agents used are recognised by another individual; and stimulus enhancement, when an individual is induced to orient its activities towards an agent or location whilst observing the behaviour or activities of another individual (Huffman & Sinha, 2011). Such mechanisms of behavioural innovation, especially when enacted in highly dynamic city environments, circumvent inscriptive actions of urban planning and actively challenge expert measures of control and regulation.

We argue that three specific dynamics of how novel behaviours learnt in urban environments could potentially circulate through animal populations provide useful cues for thinking about the ecological politics at work in trajectories of urban governance. The first of these encompass rapid-spread patterns, where a novel behaviour spreads through a segment of a group, indicating horizontal, within-generation, cultural processes. Bipedal begging for food from tourists is one such behaviour, whose spread has been documented in certain urbanised bonnet macaque populations (Sinha, 2005). All enactments of such behaviour, however, were done by high-ranking individuals alone. Geographical fieldwork shows how people affectively respond to these bodily acts of macaques. Animals generate responses of sympathy and care by mirroring their bipedal human counterparts, consequently increasing positive responses and chances of getting morsels of food. In New Delhi, urbanised populations of rhesus macaques too have been seen to exhibit bipedal begging behaviour,

drawing the attention of pilgrims, street vendors and passers by. The boldness in macaques generated by provisioning has resulted in the Delhi government serving court orders banning public feeding of monkeys and a concomitant establishment of collection centres at designated localities for food that devotees might wish to offer (Anon, 2009). Yet, as our earlier field experiences suggest, religious sentiments and affective encounters override such dictates, putting in place a complex ecological and cultural geography difficult to grasp through majoritarian logics of urban governance.

There is also a variegated geography of non-human knowledge and enskilment. The ability of primate populations to cause 'trouble' in urban settlements differs, as do their potentials in raiding crops and breaking into houses. Our ethological fieldwork showed how the most dominant alpha male of a particular troop was able to raid cars in search of food, this behaviour being subsequently learnt by a juvenile and a second adult male, but not by other members of the troop (Sinha, 2005). The second dynamic of spread of a behavioural tradition involves vertical parent-offspring learning, which has been noticed in the case of interactions with humans displayed by bonnet macaque individuals of an urban troop. Whilst the members of this group did not generally display affiliative behaviour towards people, four juveniles, all of who were offspring of a single, non-aggressive, tolerant mother, regularly interacted affiliatively with humans. The spread of skills and potentials through which macaques negotiate the urban can be further assayed through a third mode: group-specific patterns of learning. Certain bonnet macaque groups were found, for example, to forage by raiding homes whilst others did not. Some troops processed natural foods in particular ways prior to consumption whilst other groups, with overlapping home ranges and feeding on the same food sources, followed other processes (Sinha, 2005). Similarly, a particular group was observed to display aggression towards humans, which, in macaque vocabulary, translated to the vigorous shaking of tree branches as indicative of a threat, but this was not enacted by individuals from another troop occupying an overlapping home range (Huffman & Sinha, 2011). We thus, contend that there might be a high degree of variability in terms of which individuals and populations forge contacts with people. Macaques' encounters with people in urban settings essentially involve heterogeneity, for capacities to affect or be affected are differentially distributed. Paying attention to such differences is perhaps critical for future interventions to regulate macaque populations in Indian cities.

Taken together, these studies point to an ecological politics of the urban, in part dictated through the relations that macaques have with other denizens of an urban milieu and in part by what is meaningful to the animals themselves. Individual non-humans might consent; some even advance propositions for engagement, whilst others may not. Paying close attention to these processes, through etho-geographical registers, provides a more nuanced set of interventions to understand how non-human lifeworlds and practices begin to matter to political adjudication and urban governance. Future urban ecologies could significantly benefit from understanding the geographies of animal knowledge systems, not just under the homogenising sweep of species worlds but also in terms of differences in individual temperaments and dispositions, ontogeny and upbringing, which, as this etho-geographical conversation shows, is perhaps never free of the sticky web of entanglements with human activities, attitudes and actions.

Space: territorialisation, mobility and topologies

That cities exist only through particular productions of nature and space, both internally and in their hinterlands, is a commonplace dictum within the urban political ecologies literature (Braun, 2005; Swyngedouw, 2006; Swyngedouw & Kaika, 2014). Forms of territorialisation, through which animals are subjected to all manner of socio-spatial inclusions and exclusions from cities, have long been the focus of animal geographies (Philol, 1995). Much emphasis has been placed on how animals are discursively constituted and practically affected as a 'marginal social group', impure, polluting, disruptive and discomfiting *occupants* of the urban where humans are alone supposed to live and work. Whilst initial diagnoses of spatial practices that lead to urban animals being present or absent in cities have now paved way for studies on the biopolitics of animal population control (Srinivasan, 2013) or political ecologies of dispossession, enclosure and gentrification (Palmer, 2003), they remain couched in analytics that view urban animals' spaces to be imposed upon them from without. Little progress has been made in terms of understanding how 'animals are critical to the making of places and landscapes', voiced by Jennifer Wolch in her classic paper on urban animals more than a decade ago (Wolch, 2002).

Part of this lacuna lies in the theoretical frameworks within which urban political ecologies are couched. Although animals are viewed as creatures that constantly transgress human placings or as recalcitrant beings that challenge, oppose or remain obstinate to territorialisations that people, institutions or the state impose upon them from without, they are not seen to be beings that transform and *appropriate* the environment. The act of appropriation, be it the enclosure of commons or ownership over the animal body, has thus, long served to place human beings alone on a pedestal above the natural world of things (T. Ingold, 2000). Appropriation, as a solely human form of territorialisation, implies that ultimately it is only humans who own whilst animals are only ownable (see also Sinha, 1995). The logical corollary of this argument is that animals cannot produce space; what ultimately matter in urbanisation, as a particular mode of spatial production, are the spatialising activities of humans alone. Widespread moves to translocate and 'rehabilitate' rhesus and bonnet macaques from Indian cities to rural commons (Imam, Yahya, & Malik, 2002) embody and set these logics into motion.

Although we do not eschew the conceptualisations of uneven geographies of appropriation and territorialisation, we argue that it is vital to think of spatial production in terms of non-humans as well, especially if one is to arrive at a richer conceptualisation of space within urban political ecologies. Behavioural ecologists have dealt with aspects of animal territorialisation at great length, often illuminating how macaques apprehend and construct space. Each macaque group tends to live in a circumscribed area known as a home range, which, far from being arbitrary or imposed by humans, is contingent upon inter- and intra-group dynamics and has an active relation to the niche they construct (Pirta & Singh, 1980). In fact, many macaque groups actively choose territories that are rich in human-provisioned resources (Sinha, 2001), thus, setting into motion a cascade of interspecific interactions with wide ramifications for what we label the *urbanisation* of these groups. Territorial boundaries may occasionally be fluid but macaque troops display strong traditional attachment to specific areas within their home range. 'Characteristic patterns of daily routine with stereotyped patterns of movement', be they excursions through urban landmarks such as tanks, favoured residential areas and marketplaces, lead to the construction of home ranges (Southwick,

1962, p. 439). When ranges overlap, group movement may be patterned on inter-group avoidance, with subordinate groups retreating from larger and more dominant groups. Inter-group dominance may also be place-specific, with particular troops dominant in certain localities but not in others. Ethological registers, thus, call for an overhaul of the static notion of animals being *occupants* of an already-built world, to embrace one of them being *inhabitants* of a world in continual emergence, brought about through embodied, experiential movement and dynamic social relations.

Two basic patterns of competitive territorialisation have been described in macaques—scrambled and contest competition (Sinha, 2001). The former involves modes of passive competition and accommodation, with peaceful retreats from areas of shared resource use, whilst the latter implies intolerance of the close proximity of other groups and active competition, in which groups may be forcibly evicted from areas of common resource. Contest competition is, therefore, often contingent on active aggression, which might take the form of violent fights between individuals and more subtle forms of communicative threats relying on visual cues (Southwick, 1962). A number of factors influence such territorialisation in macaques. Food sources and affordances of the environment play an important role, as, for example, overlapping home ranges may be possible when groups of different sizes use different resources. Urbanisation, on the other hand, clumps rich food sources, with groups becoming strongly territorial (Sinha, 2001). Yet, there is also a phenomenological dimension to territorialisation. The personality and aggressiveness of specific individuals, especially the most dominant alpha males, are vital in the maintenance of spatial relations between groups. Alpha males often form coalitions with other individuals to secure their status, and thus, intra-group relations can configure how macaques territorialise. Furthermore, home ranges also depend upon the individual's knowledge of particular habitats, accumulated through lived experiences. Males that have a propensity to migrate may be more adept in taking groups to new areas (Pirta & Singh, 1980). Paying attention to these individual- and group dynamics, the lifeworlds of macaques, is thus vital for understanding territorialisation and spatialities of the urban, in more-than-human terms.

A productive arena for future interdisciplinary exploration, we believe, is to examine urbanisation as a continuous de- and re-territorialisation of space through modes of composition and movement between people and macaques. For instance, studies show that the capture or removal of alpha males can lead to significant contractions or deflection in troop home range size (Pirta & Singh, 1980). Unexpected atypical movements of the group outside its usual home range may be followed by high rates of mortality and changes in behavioural patterns different from those enacted within more familiar ranges. Several individual activities—day resting, sleeping, foraging and social interactions—may decrease drastically during such periods, especially when in anthropogenic habitats (Sinha, 2001). Here, geographers' understandings of the enclosure of urban commons, and of the power relations that sustain particular imaginaries of the urban everyday could be mapped into ethological studies of macaque production of space. This would enable a more sophisticated analysis of urban ecologies and also potentially generate new ways of thinking about ethology in contexts where macaques and humans inhabit common worlds with shared histories.

Furthermore, the place-making activities of animals need to be understood not just in terms of territorialisation but also topologically, through the mobilities of macaque groups and individuals. For instance, mass translocation of rhesus and bonnet macaques from Indian cities has spatially and temporally crumpled traditional biogeographies of the two species,

with uneven and dynamic effects. The distribution of the two macaques has traditionally been considered to be separated by major rivers in southern India, but recent biogeographic work has found rhesus macaque populations to have expanded their range into areas formerly inhabited only by bonnet macaques (Kumar, Sinha, & Radhakrishna, 2013). Translocation of the rhesus from urban areas, severely affected by human–macaque conflict (and witnessed in the above example of New Delhi), is the major driver of these altered biogeographies, supplemented by the animals' use of man-made conduits such as bridges to cross biogeographic barriers. Mobility of the more aggressive rhesus macaque has, in turn, led to a displacement of bonnet macaques from many parts of their original distributional range, including expulsion of the latter from urban to forest habitats, where they may still be able to outcompete rhesus macaque populations (Kumar et al., 2013). Cosmopolitanisation of the rhesus has, therefore, resulted in the emergence of new socio-ecological configurations, with mixed troops of the two species coalescing in certain locales. Hybridisation of the two species has now become a distinct possibility (Radhakrishna & Sinha, 2011) but what might also be at stake is the emergence of new 'macaque cultures' as a consequence of human-induced mobility and cross-species aggregations (Kumar, 2012).

Mobilities, indeed, promise to be a burgeoning area of research within urban geographies, with a strong emphasis on how and why cities are produced through cross-scale, inter-city relationships and movements (Jacobs, 2012). Although animals seldom surface in these literatures (but see Barua, 2014b; Cresswell, 2014), the cosmopolitan biogeographies and novel configurations that we have highlighted point to the importance of investigating animal movements ethologically, particularly if urbanisation is to be understood as an emergence of particular mobilities and mobilisations of nature. Equal effort needs to be invested in examining socio-political consequences of human-induced animal mobility. Our preliminary observations suggest that the translocations of macaques could follow a chain down the Indian socio-political hierarchy, with troops caught in prime urban centres being released in city suburbs, followed by further trapping and relocation to rural and forested hinterlands.

Recent proposals to release New Delhi macaques in 'remote northeastern India' is also reflective of such forms of geopolitics (Marcin, 2015), with serious repercussions also on biodiversity patterns as well as on animal and human welfare. Animals from urban locales carry forward their specific knowledges and continue to replicate raiding behaviours learnt in cities. Our fieldwork shows how macaques from New Delhi, shifted to its fringe forests, have begun to move into nearby residential areas much to the chagrin of local communities. Everyday life is disrupted: children avoid sitting next to windows in schools in fear of macaques and residents have begun to cover their roofs with thorny branches to prevent macaques from jumping onto them. Not only does this displace 'the problem' onto the rural poor, but other macaque troops in the vicinity might now learn to raid houses and neighbourhoods through emulation. The political ecologies that emerge through these mobilities offers up new ways to examine connections between the city and the countryside, an area of inquiry that has long been one of urban political ecology's enduring concerns (Braun, 2005). It also points towards dissecting urban governance and policy in terms of movements and flows, where heterogeneous, more-than-human, modes of knowledge are in circulation, and capacities to receive, resist or modify policies can count as animals' achievements too.

Conclusion: an etho-geographical conversation

This paper began with two wide, interrelated concerns. The first pertains to developing conceptual insights on how we might understand what urbanisation entails for non-humans, the ways in which they inhabit dynamic environments according to their own knowledges, durations and rhythms. Secondly, we argued that such an intervention requires formulating an inventive starting point such that conversations between ethology and geography become possible. Our provocations on urbanisation, knowledges and space, thought through with our engagements with urban macaques, we hope, have made some headway on both these fronts. In this brief conclusion, we want to reflect on both these concerns by asking what an etho-geographical conversation might achieve in terms of addressing erstwhile calls for animating urban theory and concurrently, what such a conversation might mean for the respective disciplines concerned?

An etho-geographical understanding of lifeworlds of macaques in urban contexts enables distinct ways to decompose how nature is urbanised. We posit urbanisation not as something merely going on in cities, but as a process where dense traffic in commodities and materials transforms lifeworlds of humans and animals, with asymmetric and often disturbing effects. Such transformation is unevenly played out in the lifeworlds of macaques, manifesting in changes in social structure, behavioural repertoires and life-history strategies. An etho-geographical conversation, as we have shown, entails paying close attention both to non-human lives and the circulation and cultural appreciation of provisioned food commodities, for both co-shape one another. Such transformations also have bearings upon ways in which urban governance might be conceived and enacted. We highlight how knowledgeability of the urban is encapsulated by a heterogeneity of actions, motivations and effects of situated human and non-human actors responding to one another's ebbs and flows. They are products of mutual histories of cohabitation, sensed by animals as much as by human protagonists, shaping working practices of the urban and stretching them in new directions. Reflecting on differential non-human knowledges foregrounds a micropolitics where alliances and logics of urban flourishing are not already decided but come about partly through animals' actions and often on their terms. An etho-geographical conversation, thus, posits alternatives for thinking about urban governance than those currently put into effect by state and bureaucratic apparatuses. An *ecological* politics of inhabiting the urban going beyond representational straightjackets then comes to the fore.

Furthermore, our conversation pushes forward ways in which we might account for non-human spaces within cities. We evoke space not simply by dissolving binaries between the 'in here' of the polis and the 'out there' of the wild, but also by accounting for its multiple modes of production, where all kinds of human and non-human movements, rhythms and territories give rise to an urban spatial ontology. Animal territorialisations, highlighted above, are important to think about in the contexts of 'the zoöpolis' (Wolch, 1996), 'beastly places' (Philo & Wilbert, 2000), or what have been termed as 'spaces to be nonhuman' (Hinchliffe et al., 2005). These, we contend, do not lie diametric to human placings and are not constructs with layers superimposed over an environment already existing in advance. Rather, they are rhizomatic or mycelial topologies composed through human, animal and material mobilities, with differential speeds, pulses, temporalities and uneven relations of appropriation and enclosure.

We recognise that macaques lend to very specific articulations of the urbanisation of nature, non-human knowledges and their concomitant spatial topologies and which might take very different forms if one were conducting etho-geographical investigations into the lifeworlds of other kinds of organisms entangled in and co-constituting urban political ecologies. Macaques enable certain concepts to emerge as foci of conversation between human geography and ethology, but also constrain where one can run with them. Yet, it would be a mistake to equate our conversation around commensal primates to be an idiographic dead-end; rather, we envisage this conversation to be one of opening-up, of provoking alternate questions, abstractions and theory-building that might become possible when other modes of participation in urban worlds are enacted.

To this end, we contend that an etho-geographical conversation has much to offer for geographical thinking about the urban. Firstly, it enables paying more careful attention to processes outside the direct purview of society, but nonetheless crucial to developing 'thicker' notions of hybridity (Lulka, 2009). This is exemplified by the ways in which differences from the typical, subsumed by the term 'urbanisation of nature', become visible. Conversations with ethologists show how urban and non-urban lifeworlds of macaques can take very different trajectories and highlight how *their* knowledgeability of the urban takes specific forms with distinct political effects, the richness and heterogeneity of which are poorly encapsulated by perspectives mobilising appellatives such as 'species' (Kirksey & Helmreich, 2010). Secondly, an etho-geographical conversation, by tracking different modalities of knowledge at work, significantly enhances geographers' ongoing work to rethink and redistribute expertise in ways that resist the familiar architecture of urban analysis (Hinchliffe & Whatmore, 2006). And thirdly, it provides richer ways in which spaces of embodiment, motion and relation, of paramount importance to the 'more-than-human' project (Whatmore, 1999), might be sensed and their political import articulated.

The purchase of ethology for geography and the wider social sciences is evident, but traffic in the other direction has seldom been commented upon. Many of the questions that urban political ecology and animal geography grapple with—dissolving distinctions between nature and society or accounting for humans as a planetary force—do not readily chime with the paradigm of ethology that has tended to privilege the natural or habitually fall back upon it as a baseline category. Nonetheless, conversations with geographers enable ethologists to think differently about their study systems, particularly in this case where urbanisation processes radically alter the social structures and individual biology of non-humans, in this case macaques. Furthermore, recent developments in ethology, including consideration of Lamarckian inheritance patterns in evolution (Jablonka, Lamb, & Avital, 1998; Sinha, 2005), its move away from Cartesianism and concomitant turn to animals' awareness or what has been called Tinbergen's fifth question (Bateson & Laland, 2013), and theories of niche construction (Odling-Smee, Laland, & Feldman, 2003), accord with geographical thinking on urbanisation, knowledge practices and spatial production. These are likely arenas for fertile future rapprochement.

An etho-geographical conversation, however, is also a line of flight through an interdisciplinary middle (Deleuze & Parnet, 2007), emerging between ethology and geography, and not reducible to either of the two. Macaques have provided us an inventive starting point for engaging differently with the familiar architecture of urban theory. What emerges through such a non-human etho-geography is a set of concepts pertaining to a heterogeneous ecology, not hierarchy, of urban knowledges and practices at work. The potential of this proposed

interdisciplinary engagement for explaining lively, metabolic political economies, the biopolitics of control, risk and resilience, and the spatialities of the urban everyday are immense. This conversation has been begun in an optimistic vein, with an enthusiasm for the novel. The durability of its provocations, however, needs to be put to further test. No mean feat possibly, but one that calls for more, not less, continuing future investment in understanding the flow of human and non-human lifeworlds as they intermingle in ever increasing, pervasive anthropogenic landscapes.

Note

1. For exceptions, see H. Lorimer (2006) and Barua (2014a), although these do not pertain to urban contexts.

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