# Matthew Gandy on urban infrastructure and disease

**Transcript of a conversation with Karl Broome and Elizabeth Shove**

**Karl Broome:** So as we said, Matthew, we've read a few of your papers and we've got some questions relating to them, but to get things going, can you stay a little about how you've come to be writing about the urban and about epidemiologies, infrastructure and disease?

**Matthew Gandy:** I'm a geographer based at the University of Cambridge, having worked previously at UCL, and I'd say I was a cultural urban and environmental geographer. Thematically, I've been looking particularly at biodiversity, landscape and infrastructure and in relation to that, also epidemiological themes and methodological aspects, including visual methodologies. The question of epidemiology has been of interest for me for a long time.

When I started doing research on the environmental justice movement some years ago, clearly questions of public health were very important. I was interested in linking those concerns with environmental questions and then doing work, for example, on Cholera and infectious disease. I also did some work on the history of infrastructure networks and more recently, the return of tuberculosis, especially multi-drug resistant tuberculosis. And then in some of my more recent work, I've been returning to this theme in relation to what I have termed zoonotic urbanisation.

**Elizabeth Shove:** That already covers quite a lot, Matthew. You've covered a lot of empirical sites, but and a wide a range of themes, infrastructure, spread scale and so on and so forth, and the zoonotic as well. So I was wondering, what holds this together? Is there an argument or position that you're unwinding or are you responding to whatever comes across the deck? Do you see a core agenda that you are working out?

**Matthew Gandy:** I think my work's always had a strongly exploratory aspect, so I'm finding out about a range of topics as I work directly on them and out of this current phase of work I'm moving towards a research monograph on this broad theme of zoonotic urbanisation, but from my perspective, this is not something restricted to discourses of public health: it touches on a whole host of cultural and political themes including cinematic or literary depictions of pandemic imaginaries, or various dystopian representations of the future, and so on.

My work has been connected with urban political ecology for some time, but I'm also very interested in the environmental humanities and the way that literature, film, poetry and other sources can provide additional insights that might be lost by a more narrowly social scientific or biomedical perspective.

**Elizabeth Shove:** One of our puzzles is also about the theoretical roots of your work. You've mentioned various sources, but there are different positions within cultural geography. What is your stance, theoretically?

**Matthew Gandy:** I would say that my work has been influenced to a significant degree by materialist and neo-Marxian perspectives running through urban political ecology but also by links to critical landscape studies. People like Stephen Daniels or Denis Cosgrove, for example. One of the outcomes of that from my perspective is a certain scepticism towards some of the new materialist literature, including more-than-human perspectives within geography and allied fields, because I like to articulate a more nuanced stance in relation to agency and especially historical aspects of human agency.

So in terms of some of these theoretical debates, I've been quite influenced by the recent work of Kohei Saito, the Japanese philosopher and theorist, who emphasizes the independent agency of nature as a field that can't be subsumed within certain social constructivist perspectives. Saito is quite critical of some of the perspectives within human geography. Marxist geographers such as Dave Harvey have been immensely reluctant to acknowledge the limits to nature as an ontological realm that operates alongside human history.

Although I'm very much rooted in these radical literatures, I'm also aware of certain weaknesses or conceptual edges that we need to be aware of. The insights of sociologists such as Ted Benton remain significant in trying to keep hold of a radical concept of nature that is not something that is purely socially constructed – a position which was quite widespread within a range of literature over the last 20 or even 30 years.

Those are some of the conceptual tensions with that are interesting to me in terms of trying to navigate this complicated field and of course when we get onto the topic of nature itself, it's immensely complicated. In my recent book on urban nature, Natura Urbana, my first task was to try to make sense of a vast and rapidly growing literature and to try to create a kind of conceptual framework that could help me position my own work in relation to these different strands.

A lot of my work has been very closely based within the urban political ecology field, including classic interventions by Erik Swyngedouw and others. I'm interested in connecting urban political ecology with newly emerging ideas about multi-species urbanism, living with non-human others, and other contemporary theoretical debates. There are lots of really interesting ideas currently emerging and I'm interested in fostering innovative forms of conceptual dialogue.

**Karl Broome:** One of the things I've enjoyed reading in your work, Matthew, is that in your earlier work, and more recently, you have stitched together all these, like broad references and different kinds of ways of thinking to consider the Bacteriological City and Zoonotic Urbanization, but could you say more about how you approach the topic of understanding how diseases spread? How do you conceptualise that?

**Matthew Gandy:** The question of disease spread can be linked to specific kinds of periodicities, outbreaks, and historical events. In terms of my earlier work on urban infrastructure, I was especially influenced by literature on the Hamburg Cholera epidemic of 1892 that had profound implications in terms of how local government and public policy was conceptualized with many different implications.

There is a certain dynamic in terms of the inadequacies of historical conceptualizations of threats, revealed by material events or outbreaks, and on the other hand a shifting of perceptions and institutional framings of disease outbreaks.
In the case of vector-borne disease we have to think quite carefully about the changing distribution of both vectors and pathogens. If we're talking about malaria, for example, the Anopheles mosquito is still present in the UK but malaria is not.

Climate change is also having a profound impact on the distribution of vectors and pathogens as well as new patterns of global mobility.

On the question of agency we also have to be aware of the evolutionary dynamics of pathogens or vectors which has both a temporal as well as a spatial dynamic. So, I think the question of disease spread has many different dimensions.

**Elizabeth Shove:** So how do you do this kind of work in terms of methodology? You've written a lot about infrastructures and it was interesting to hear you talk just now about Hamburg and cholera, but how do you choose both a period and a place? Are you looking for good examples that will help you take a specific issue further? Or is it a bit the other way around? Of course, it's likely to be a mixture of the two, but is there any kind of pattern there?

**Matthew Gandy:** On the specific question of Hamburg, I was Richard Evans's book, *Death in Hamburg* that illuminated all of these interconnections. Methodologically, I was struck by the rigour of the archival research and the brilliance of the writing. There is also Frank Snowden's book *Naples in the time of Cholera* that develops a similar theme. So we have these very interesting examples of research which have used disease outbreaks as a kind of entry point from which to explore a number of different urban developments.

In terms of research methdology I am very interested in what I would refer to as entry points and vantage points, which extend to disciplinary perspectives and research traditions. The question is how these come together in relation to a particular piece of research and writing.

**Elizabeth Shove:** On entry points we thought we'd pick up some of the things you've said, for example, about how urban infrastructures, water and bacteria, go together. You write about 'the technocratic paradigm of large-scale infrastructural development.'. A lot of other people have also written about networked infrastructures and modernity, but isn't this a bit lopsided? What about the demand for water, or cleanliness, or mains sewage. How have you been thinking about the everyday practices on which infrastructures depend?

**Matthew Gandy:** I think when we're talking about infrastructure systems or networks, there's a co-evolutionary dynamic. Water is a very good example in that the greater availability of water began to influence people's use of water.

**Shove, Elizabeth:** Sure.

**Matthew Gandy:** Interventions in relation to cultural history such as Alain Corbin's emphasis on the emergence of the individual modern subject and how this is reproduced in the architectural design of space.

But you did raise a very interesting point about the degree to which these infrastructure networks and modernity might be synonymous. On that I would be cautious because we know that there are very sophisticated technological systems in the pre-modern era, even some that are still operational as in some of the desert cities of northern Iran and elsewhere. The city of Yazd, for example, has wind towers, which are amazing architectural features that help with the circulation of air as well as the city's underground water supply system, bringing potable water from the mountains. We should be careful not to subsume complex technological networks into one particular variant of modernity.

**Shove, Elizabeth:** A further question for us is how you are conceptualizing infrastructures, not only the Marxist view, but also the regulatory angle. On top of that you are also locating them in particular places and times, but what is distinctive about what Matthew Gandy has to say about infrastructures?

**Matthew Gandy:** What may be distinctive about my work on infrastructure systems is a recurring emphasis on relations between infrastructure and landscape and my interest in cultural and aesthetic dimensions that are sometimes lacking within the political ecology literature.

**Elizabeth Shove:** We've already touched on some of these questions but to go back to issues of circulation and spread, there are arguments, for example, in practice theory, that this language disguises the fact that practices are reproduced in similar ways in different places might look like spread, but spread is not a concept that explains how this happens. Instead, explanations focus on recurrent and situated reproduction, which is a different story.

Now, you may or may not engage with that kind of argument, but it will be interesting to hear what you have to say.

**Matthew Gandy:** Well, I think it's many different things - it's not just one thing that we're talking about. We're not only talking about one particular vector, we're talking about a kind of constellation of different elements, from architectural design to food production, many, many different things that are combined together. But I think that perhaps one of the strands that comes through for me, looking through these debates, and these literatures, is the multi-scalar aspect, which I think relates more broadly to shifts in urban studies, where there's been a movement away from thinking about cities as bounded or clearly demarcated spatial forms to extended patterns of urbanization.

The concept of planetary urbanization has been quite influential. Although I take a slightly different view in that I wouldn't argue that the rural has disappeared or that the world is completely urbanized. I think we do need to hold on to the diversity of different kinds of land uses, spatial topographies, and so on.

The term zoonotic transfer zone is something that's caught my attention in terms of the initial spread of zoonotic infections from bats, monkeys, or other organisms into patterns of human mobility and food supply chains. So we can think about scale and mobility in a number of different ways.

**Karl Broome:** It might help to bring it down and focus it on a very specific vector. I tend to focus on the tiger mosquito, and because of mobility and climate it is now on pretty much every continent across the globe. Mosquitoes feature quite a bit in your work, but returning to that idea of spread and the spread of mosquito borne disease, could you tell us a bit more about how this relates to your idea of zoonotic urbanization?

**Matthew Gandy:** When academics get interested in the other-than-human, what is it that they are engaging with? I have colleagues looking at cows, pigs, and chickens, for example, but for me, entomology is my way into these questions, and into urban biodiversity and aspects of epidemiology. For me the entomological aspect raises a whole host of interesting questions including the significance of citizen science projects and the tracking of insect vectors.

I think that we're at the at the edge of what is possible in terms of the boundaries of observational science and citizen science, because there are some species like *Aedes albopictus*, which most people with some training can probably identify, but then you get into the Culex genus, and into very complex questions that go beyond morphological difference and need to be resolved through DNA analysis or other means. So it's a very, very complicated field. How do you engage public culture in these questions? What specific contributions can ordinary citizens make to understanding or tracking these organisms?

But more broadly on the question of mosquitoes, I'm conscious of some of the blind spots in relation to landscape design or the use of natural floodplains, sponge cities, and things of that kind. And

clearly, I think there needs to be a more sustained conversation about the role of water in urban and landscape design.

Prize-winning architectural designs from Italy, for example, have been used in Chengdu, in southern China, with very problematic consequences in terms of the spread of dengue. I think you get these unforeseen consequences sometimes with architectural design discourses that simply don't engage enough with local ecological specificities. We need a much more nuanced or differentiated engagement with aspects of the natural world, including insects and mosquitoes.

I know in Germany there have been quite sophisticated attempts to develop citizen science projects and I could see that being rolled out across a much wider range of regions or countries.

**Karl Broome:** I know there is a project in downtown Baltimore looking at kind of the relationship between social inequality and the prevalence of particular mosquitoes and disease spread. On paper, it sounds great to get citizens engaged in the research, but actually the practice of doing that is very problematic in the space of just two or three years.

I know you've worked in lots of different places so could you speak to the challenge of getting people from different kinds of groups or stakeholders to actually work together?

**Matthew Gandy:** One methodological strand that I've been thinking about recently is “attentive observation” and what it means to enhance the level of close observation in terms of everyday life, particularly in relation to non-human others, so that if it becomes part of everyday culture to notice aspects of nature, to take photographs, to share information, and to build up knowledge.

A key question for me is how that might change public culture in relation to nature or non-human others.

I think also when we're thinking about mosquitoes, it's clear that some of the recent outbreaks, dengue, Zika and so on illustrate that the existing paradigms are not enough to really get to grips with the way in which outbreaks have spread, and the vulnerabilities of particular individuals and neighbourhoods, their relationships with urban topography, ramshackle housing, decayed infrastructure networks, and other factors.

I think that actually bringing this all together is a very important challenge and I think if I picked up correctly on your point there, there's something of a disciplinary gap or even suspicion between these different fields of work. Certain kinds of biomedical work can get access to funding relatively easily, but it is much harder for anthropologists or people from the social sciences who might have really interesting things to contribute to these debates.

I think that genuine interdisciplinary dialogue is complicated and difficult and I am struck by how some of the literature remains resolutely multidisciplinary, just bringing in extra data sets. Often the conceptual framework is not really advanced.
Significantly, there are some people who are doing this in a very interesting way. I think Christos Lynteris, for example, is doing outstanding work in linking science and anthropology in interesting ways, so this kind of work can be done, but I think it's very complicated.

**Elizabeth Shove:** But Matthew there are also important theoretical differences. For example, when you talk about agency, where do different disciplines think it lies? Disciplines are bound to different kinds of commitments and on that topic and others they're not necessarily compatible. So the multidisciplinary thing might still be a bit of a charade, after all, disciplines see problems in a

fundamentally different way. For example, you are a cultural urban geographer, and that's where you come from, but you're working with other disciplines, so do you hang on to your traditions or do you bend?

**Matthew Gandy:** I think in some ways I have a kind of double identity as a geographer and an entomologist. So I've always taken the science seriously, even if I'm writing about something unrelated such as Italian cinema or whatever it might be.

I think this term incommensurability is interesting to me. At a philosophical level, there is an acknowledgement that certain analytical frameworks simply can't be merged, and I think that an acknowledgement of those difficulties is perhaps the first step to thinking more laterally, or imaginatively, about how to bring different ideas into dialogue.

And one thing that does strike me, actually, in terms of the broader kind of urban environmental field, is this push towards new forms of interdisciplinarity in fields such as systems-based ecology and social ecology: there are multi-million pound projects to analyze different kind of transitions to future societies, bringing together sociologists, engineers, and many different people and I'm always a bit concerned looking at some of the outputs from these projects that the underlying incommensurabilities are not acknowledged or systematically engaged with.

**Elizabeth Shove:** We've got funding for a conference on practice theory, microbes, urban change, scale and public health. Now those are fields that also haven't necessarily come together. In fact, many social scientists haven't really come across practice theory very strongly. They might have read a bit of Giddens, or heard of structuration theory, but that's about as far as they got. So we have got some challenges here because practice theory has quite a lot of commitments associated with it, and it's not that easy to fit with other disciplines. But I'm wondering where you see new ideas coming in. Would some interaction between social theory and biology help?

**Matthew Gandy:** I think there are lots of interesting theoretical and conceptual debates taking shape, but they're not necessarily in the Anglo-American intellectual sphere. I think we should be ready to engage with other linguistic fields of conceptualization, for example, in Germany, there's a lot of work going on in sociology by Andreas Reckwitz and others. I think we need to be open to all sorts of interesting debates that are going on out there.

**Elizabeth Shove:** So let me ask, how do you think Reckwitz speaks to your work?

**Matthew Gandy:** I've tracked his work in relation to the Covid-19 pandemic.[1] He has made some interesting interventions, and yet I have to say this. I think that some of the conclusions that I looked at seemed to read contemporary German society as a kind of universal template for modernity.

When we speak about vantage points as well as entry points we need to be much more aware of perspectives from the global South. I think certainly within geography and related fields there is some change that is discernible. I know from my time as an editor of one of the major geography and urban studies journals that you get interesting articles from the global South that feel compelled to frame their analysis by referring to scholars from Europe or North America who have never been to the cities that are being discussed. So how do we break out of that mould and open up to a wider range of perspectives?

[1] https://open.spotify.com/episode/7d3AXhKYxhtptSZKocoV0n

**Karl Broome:** To finish, and to quote, you say 'implicit here is the need for a conceptual synthesis between the structural and a molecular realms of global health.' I think that nicely links to what we've been talking about, and about how different layers or realms connect.

**Matthew Gandy:** Yes, I mean, I think I think that the molecular realm is something that we do have to engage with, as part an expanded epidemiological focus. I think it relates to my interest in the co-evolutionary dynamics of urban space and I think maybe that relates to some of your work, Karl, on citizen science. When we link citizen science with fields such as DNA barcoding and the possibilities to generate new kinds of data we can bring the microbiome and the molecular realm into view through new kinds of methodologies and analytical tools. I think that is interesting.

I wouldn't want to predict the future, but I think over the next five to ten years, I think the molecular realm and particular kinds of analytical tools related to DNA sequencing and things of that kind will become more and more prominent because they're generating new knowledge and research objects that we may not yet have fully engaged with in an urban context. There has been some quite fascinating exploratory work, for example, to analyze urban surfaces and extend the frontiers of public health knowledge.

The analysis of wastewater has actually proved quite significant in terms of tracking the persistence of Covid-19 or the worrying presence of polio, for example. So there's quite a lot going on here in terms of generating new data frontiers and new analytical approaches.

**Elizabeth Shove:** So you mean the method of detection and precision is creating, well perhaps not exactly creating problems, but identifying them in different ways?

**Matthew Gandy:** Yes.

**Karl Broome:** It's interesting to think about that might potentially play its way out in terms of how we live, you know, we already use tracking technologies and this might actually change the practices through which we recreate the world around us and recreate ourselves.

**Matthew Gandy:** Can just throw in a final comment. I went to the RGS-IBG conference in London and there was quite an eye-opening paper on this topic. There are a number of private companies now getting involved in the DNA analysis of wastewater which are doing work on behalf of the American prison service. For example, at the height of the Covid-19 outbreak there were attempts to use DNA analysis to monitor the virus in prisons because there was a fear of a major outbreak with mass mortality. There are different layers of governmentality here which would be very interesting to explore further along with new biological frontiers for capital accumulation.

**Elizabeth Shove:** There's a lot more to do, but I think we should leave it there. Thanks Matthew.