Analyses such as these valuably demonstrate how the built environment is a constitutive mediator of urban practices, in the sense of opening up both foreseen and unforeseen spaces for activities. Moreover, by engaging both forms of embodiment and the capacities of materials, such as brick stones (Edensor 2013), to enable sensual and imaginative experiences, this line of work serves to open up new exchanges between STS and urban studies on the question of how to retheorize the specific "affective atmospheres" (Latham and McCormack 2009) of city settings in nonreductive and materially sensitive ways. This may, in turn, invite analysts to ask questions about those affective energies of specific urban milieus, such as the Biopolis research center of Singapore (Ong 2013), where sciences are made to thrive. So far, however, while studies of the built environment are almost invariably placed in the city, the STS approaches reviewed here cannot be said to have conclusively shown how buildings contribute to the making, remaking, and unmaking of entire cities. On this point as well, there is potential for further cross-fertilization of STS and urban studies.

Reassembling the City

Yet a third type of STS accounts of cities has relied on the conceptual repertoires of ANT and related intellectual projects. In this third avenue, which has come to be known as assemblage urbanism (e.g., Farías and Bender 2009; McFarlane 2011a), the city is cast not primarily as a novel site in which to study science and technology or as confronting STS scholars with new difficult artifacts, such as buildings. Rather, what is at stake is the extent to which it is necessary to recast and reassemble the very object of urban studies: the city.

Making the Invisible City Visible

Whereas strongly relational and postrepresentational approaches to the city began to emerge in the fields of urban studies and urban geography in the mid-1990s, probably the first dedicated work by an STS scholar to address the city on such terms was the book-website *Paris: Ville Invisible* by Bruno Latour and photographer Emilie Hermant (1998). This work focuses on different urban sites of material practice, embodied circulation, and infrastructural maintenance and coordination. While the deployment of the medium of the web mimics the dystopian imagination of the death of physical urban space with the rise of ICT, nothing could be further from this work's main tenets. The book-website serves rather to demonstrate that visual and textual representations of cities are always locally assembled and that the urban experience involves a constant passage through a proliferating array of interconnected locales.

One key focus of the book is the control rooms, in which urban technical systems and urban natures are made visible, coordinated, and organized. Within these confined sites, visual, textual, and numeric inscriptions of urban processes are accumulated, aligned, and used to inform practices of knowledge-making and intervention in urban realities. In Latour's ANT vocabulary, these sites are urban oligoptica, that is, places in which very little can be seen at any one time but in which everything that enters appears with great precision. The oligopticon stands in contrast to Foucault's panopticon; indeed, the notion aims to counteract the fantasy of totalizing overviews associated with the latter. At the same time, it shifts attention toward those crisscrossing networks of urban actors, practices, and material devices that are needed for any inscriptions to enter these often hidden places. In this sense, oligoptica not just interpret the city according to the different functions they address; rather, they involve different and overlapping ways of visualizing, constructing, and practicing a city.

Building on Latour's early work on visualization and cognition in scientific laboratory work, Swiss geographer Ola Söderström (1996) studied the role played by different visualization techniques in the history of urban planning, paying special attention to their varying capacities to make a complex object such as the city visible. Retracing the invention of the geometrical plan of the city, Söderström shows how the historical transition from an oblique to a zenithal, bird's eye gaze led to a naturalization of the city as a measurable object that could be classified in zones according to indicators such as socioeconomic profiles, criminality rate, and life quality. More recently, and along similar lines, STS-informed scholars have explored the current decentering of city visualizations resulting from the proliferation of digital interfaces articulating new relationships between citizens and urban infrastructures. Anthropologist Jennifer Gabrys (2014), for instance, has shown how smart city infrastructures perform the city as data sets to be managed and how they redefine citizenship as segmented practices of producing, managing, and monitoring data.

These developments support in different ways Latour's key claim that there is not one Paris, but multiple Parises; that is, that the city needs to be understood as a multiplicity that is simply impossible to totalize or to fix. Anticipating what later becomes his generalized social ontology, Latour (2005) extends this point to every urban agency: persons, institutions, social movements, tourists, political parties, and so on. In urban spaces one does not encounter stable subjects but rather flexible and fluid agencies being co-defined by different regimes of materiality, affectivity, and intelligence. "In front of the bank automat I had to act as a generic individual endowed only with an individual pin code; pressed against the barrier on the pavement I was a mechanical force weighing against another mechanical force; in front of the traffic light I became

a reader of signs, capable of understanding a prohibition; by swearing at a reckless driver I am transformed into an indignant moral citizen [...]" (Latour and Hermant 1998, plan 33).

The greatest challenge posed by the city to the conceptual repertoires of ANT, arguably, is precisely how to think of this multiplicity. Whereas it might be evident that different urban technical systems, institutions, and actors build up different networks, the city entails a complex multiplicity, "folded perhaps, and folded again like an origami, but flat everywhere" (ibid., plan 31). Such "flat" multiplicity remains however invisible; it is a virtual plane of potential associations. The city appears thus as a *terra incognita*, a plasma waiting to take shape (Latour 2005). In this sense, *Paris: Ville Invisible* is certainly the most overtly Deleuzian book ever written by Latour. And as such, it contains many of the key propositions that have gone into current discussions of urban assemblages and assemblage urbanism, while perhaps not yet being quite recognized for it.

Reimagining the Urban as Assemblage

While hard to pin down conceptually, the notion of assemblage has gradually come to reshape urban studies in terms of ANT-consonant principles of symmetry, flatness, and multiplicity. This reshaping, arguably, was crucially facilitated via the book *Reimaging the Urban* by geographers Ash Amin and Nigel Thrift (2002). Urban everyday life, urban politics, urban economies, urban technical systems are all recast in this book as sets of constantly evolving assemblages that collectively form what these authors (echoing Deleuze) call a mechanosphere, a virtual plane of abstract machines informing the constitution and operation of cities. Relying on theoretical inputs from ANT and technoscience studies, this is perhaps the first book to propose a radical decentering of urban actors and spaces. Tools, machines, and technical systems are to be refigured as integral parts of human actors, just as bacteria, plants, animals, and humans enter relationships of co-production in the same urban symbiotic sphere. The city appears thus as a site of intensive encounters of humans, technology, and nature. These encounters, which escape the dynamics of metabolic organization, are grasped better with the language of chemistry in terms of compositions, reactions, emergences, and intensities (cf. Stengers 2005).

In one sense, what the concept of urban assemblages does is to make explicit the key theoretical displacements in the understanding of cities put forward in such contributions: the human-nonhuman hybridity of urban associations (e.g., Hinchliffe et al. 2005); the flattening of scalar and nested models of urban space (e.g., Latham and McCormack 2009); and the redefinition of the city as a multiplicity of intensities

and ordering practices. This redefinition is indeed how ANT might be said to change urban studies (Farías and Bender 2009). Yet, at the same time, urban assemblages has also come to denote a more complicated set of two-way exchanges with urban studies, challenging ANT in particular to move in novel directions (cf. Blok 2012, 2013; Blok and Farías 2016).

Perhaps one of the more far-reaching routes opened up by assemblage thinking is the radical redefinition of urban economies and politics. Paying attention to the more-than-human passions, attachments, and entanglements occurring in urban spaces, for instance, Amin and Thrift (2002) suggest reconsidering the economic role of cities, away from the traditional macroeconomic focus on regional clusters and other urban geographies as assets for production. Instead, they underline the way cities shape the economy in terms of how urban intensive encounters are capable of constantly generating new affects and passions (e.g., Tironi 2009), thereby eventually constituting new types of demands for goods and services, demands which are however not strictly economic (e.g., Färber 2014). As such, they invite new reflections at the intersection of urban studies and ANT insights into economization processes (Callon 2007).

The city as an intensive, affective, and passionate site also defines and recasts the urban political. In one language, rediscovered recently by ANT theorists (e.g., Latour 2007; Marres 2007), it reconstitutes urban politics by way of what American pragmatist John Dewey (1927) described as publics of variable geometry and duration, constituted around emerging issues of shared concern. Following this Latourian (and Stengerian) recasting of political philosophy, urban politics becomes a version of cosmopolitics, the politics of searching for and building the shared common cosmos, an urban common world (Blok and Farías 2016; Farías 2011; Tironi and Sánchez Criado 2015). More than anything, this is a politics of urban knowledge-making, one committed to new forms of collective experimentation and learning in the city by way of constituting and strengthening urban democratic publics (McFarlane 2011a).

The Assemblage Urbanism Debate

Since 2011, lively exchanges have unfolded, primarily in the pages of the journal *City*, fueled by theoretical critiques of assemblage urbanism coming from critical urban scholars. This debate is interesting because it gives us clues to how ANT, and also more general STS insights and analytical tensions, are currently traveling across academic fields of inquiry, being taken into account, transformed, and contested.

A major critique has focused on the empirical commitments of ANT analyses of the city, and often more generally STS approaches to technoscience, as involving a form of naïve realism. Accordingly, post-Marxian critical scholars have attempted to adjudicate

different ways of using the notion of urban assemblages and to argue for "a narrower, primarily methodological application" (Brenner, Madden, and Wachsmuth 2011, 230) that could serve as add-on to more substantial forms of theoretical and critical engagement. Such a position is perhaps unsurprising when considering that the ethical and political consequences of thinking with assemblage seek to debunk, or at least seriously deflate, the very premises upon which classical critiques of ideology rest.

The first of such premises is that urban politics results from struggles among well-defined classes of humans over the appropriation of urban space (Brenner, Madden, and Wachsmuth 2011, 236). In this context, the city is conceived as a "point of collision" between the mobilizations of the deprived, the discontented, and the dispossessed on the one side and, on the other, ruling class strategies to instrumentalize, control, and colonize social and natural resources" (Brenner, Marcuse, and Mayer 2010, 182). ANT complicates this picture, not least by pointing to the importance of objects and sociomaterial devices for equipping humans with agency in the first place. At the same time, ANT also entails a shift from a conflict-based model of politics, rooted in structural (capitalist) contradictions, toward a controversy-based model of urban politics based on the eruption of uncertainty and critique (Farías 2011).

The second main challenge involves the task of the critical scholar, which in critical urban studies is usually described as deciphering the hidden structural contradictions and injustices, unveiling the ideologies of the ruling class, and enlightening people about the structural forces lurking behind their apparent matters of concern. ANT's empirical stance, and arguably also that of much other STS work, is fully incompatible with this position, as it implies modest, careful, and analytically respectful engagements with the various actors involved in urban politics—including financial capitalists and neoliberal technocrats—in order to "not impose 'ready-made explanations' upon the cartographies of actors and networks" (Puig de la Bellacasa 2011, 88).

This ANT position, however, is not without tensions of its own. Indeed, one important route for strengthening the urban assemblages approach will be to cross-fertilize it with the long feminist STS tradition and its strong focus on questions of asymmetry, invisibilization, and exclusion. This might involve following philosopher Maria Puig de la Bellacasa (2011) when she proposes to treat sociotechnical assemblages as "matters of care" rather than through the Latourian language of "matters of concern." A focus on caring entails posing the question of who actually does the devalued doings necessary to sustain urban assemblages, including sustainable or "smart" infrastructures. Thereby, the point is not just to make urban caring practices visible, but to actively generate care by way of maintaining a commitment to the possible and alternative becomings of things. Indeed, the key ethical and political question resulting from treating