

# Engaging Complexity: Social Science Approaches to Green Building Design

Krishna Bharathi

## Introduction

Every design discipline has its own way of seeing, evident in the range of artifacts, theories, methods, and contextual discourses each produces. Given that the practice of design is broadly understood as a reflective, inquiry-driven endeavor undertaken by a diversity of “fragmented”<sup>1</sup> knowledge cultures, the success of designers who opt to tackle new realms of application requires a greater awareness of connections, not only between theory and practice within a discipline,<sup>2</sup> but also between different types of relevant theories and practices *across* disciplines. In an era where pluralistic concerns must be balanced with ontological understanding, all designers should consider how disciplinary framings can shape their solutions. A very simple illustrative example that cuts across field boundaries is to consider “drawing,” rather than a specific discipline, as an analytic frame—one that reveals particular types of understanding and generates formal conclusions relative to, but distinct from, other modes of production. De Frietas observes that employing a multiplicity of “approaches and applications” in processes of making, not only reveals differences in “systems of logic,” but also broadens the scope of analytic opportunities available during “the early phases of discovering and evaluating ideas prior to the development of specific artifacts or systems.”<sup>3</sup> From this perspective, this essay delves into a family of social science framing approaches that address the built environment to provide insight into increasingly complex design problems, which fall within multiple domains of knowledge and disciplinary areas of expertise.

Like most of the design professions, the practice of architecture is inextricably object oriented, with its strongest affinity to the building scale and the narrative of the design architect’s intuitive relationship to it. However, as buildings continue to evolve into more complex assemblies,<sup>4</sup> modern architects have been required to develop design and coordination competencies that differ from their professional predecessors; skills which span a wide range of building systems planning, construction, management, and visualization skills. And thus, although the need to appropriate relevant competencies of neighboring fields

---

1 C. M. Eckert, A. F. Blackwell, L. L. Bucciarelli, and C. F. Earl, “Shared Conversations Across Design,” *Design Issues* 26, no. 3 (2010): 27.

2 Richard Buchanan, “Introduction: Design and Organizational Change,” *Design Issues* 24, no. 1 (2008): 3-4.

3 Nancy de Frietas, “Materiality of Drawing/Thinking,” *Studies in Material Thinking* 4 (2010): 2.

4 Stephan Kieran and James Timberlake, *Refabricating Architecture: How Manufacturing Methodologies are Poised to Transform Building Construction* (New York: McGraw-Hill, 2004), 1-178.

has steadily existed, the requisite knowledge base necessary to perform building design tasks is shifting in some respects. Evidenced in the increasing demand for specialty consultants who regularly participate as part of the design and construction of buildings, high performance development teams embracing sustainability most notably reflect this change. This need signals to potential shifts in how the design of the built environment is understood, and subsequently suggests that as the number of roles involved in building design processes continues to expand, the conception of the architectural design artifact itself, the building, is also shifting. So, while the design professions broadly assert that, “sustainable design must be capable of changing user behavior,”<sup>5</sup> implicit in this statement is that the *same* professions must also be capable of *changing themselves*. Recognizing that social science perspectives are widely viewed as recasting design research “from a study of things to a study of people,”<sup>6</sup> this essay focuses less on a “what to do” and “how to do it” approach in relation to building design,<sup>7</sup> and instead explores how social science approaches augment how the design of the built environment is understood. From this departure point, the bridging concept of assemblage—derived from intersections between the research interests of science and technology studies (STS), critical urban theory, and assemblage urbanism—is unpacked to highlight social science approaches to engaging complexity in building design.

### The Challenges of Engaging Complexity

Added to these issues is the question of what knowledge base architecture should be founded on. What is the fundamental knowledge that we architects possess?<sup>8</sup>

Architects of every variety often ask, “How can we work from principles when what we do is produce artifacts?”<sup>9</sup> Yet during the design and construction of buildings, they regularly translate a wide range of concepts into simple design heuristics and inadvertently consume the theories of neighboring fields. Whether in the form of applied science embedded in building technologies or in social theories of human interaction used to justify program placement, the process of effectively mobilizing a wide breadth of knowledge is necessarily heuristics-oriented.<sup>10</sup> Therefore, it is not altogether surprising that unifying theories rarely factor into the practical working knowledge of most architects, nor that theoretic architectural discourse is regularly observed as struggling to communicate to wider audiences.<sup>11</sup> This gap highlights the potential accessibility that a broader social science perspective might add to current approaches to understanding architectural building design by opening up alternate ways of thinking about how design both engages complexity and shapes it.

- 
- 5 Nynke Tromp, Paul Hekkert, and Peter-Paul Verbeek, “Design for Socially Responsible Behavior: A Classification of Influence Based on Intended User Experience,” *Design Issues* 27, no. 3 (2011): 3.
  - 6 Julka Almqvist and Julia Lupton, “Affording Meaning: Design-Oriented Research from the Humanities and Social Sciences,” *Design Issues* 26, no. 1 (2010): 3.
  - 7 Nicola Morelli, “Active, Local, Connected: Strategic and Methodological Insights in Three Cases,” *Design Issues* 27, no. 2 (2011): 90.
  - 8 Ken Yeang, “Foreword,” in *Architecture, Technology and Process*, Chris Abel, ed. (Oxford: Architectural Press, 2004), vii.
  - 9 Ibid.
  - 10 Peter M. Todd and Gerd Gigerenzer, “Environments That Make Us Smart: Ecological Rationality,” *Current Directions in Psychological Science* 16 (2007): 167-71 and Gerd Gigerenzer, Peter M. Todd, and the ABC Research Group, eds., *Simple Heuristics That Make Us Smart* (New York: Oxford University Press, 1999): 1-416.
  - 11 Allison Arieff, “Why Don’t We Read About Architecture?” *New York Times* (March 2, 2012), <http://opinionator.blogs.nytimes.com/2012/03/02/why-dont-we-read-about-architecture/> (Accessed March 23, 2012).

Arguably, this iterative notion has been acknowledged for some time and in many rhetorical forms. Fletcher and Goggin point out the phenomenon of “reciprocal action,” which attributes to design the achievement of “environmental, economic, and social policy goals at national, regional, and international levels,” and in turn, the understanding of “the role of design in creating more sustainable forms of living and working is a reflection of the broadening concerns and issues that are increasingly accepted as influencing the work of designers.”<sup>12</sup> In sustainable construction efforts, this relationship has translated into examples that include the promising work of researchers of Moffat and Kohler, who propose methods rooted in a social ecological systems (SES) framing to expand building boundary conditions that reflect this stance. By assessing the total sum of material flows in and out of multiple housing block developments and emphasizing the physical flows between buildings within larger parcels of land, the work provides an alternate way of understanding architecture within the urban landscape from a dynamically linked, multi-site perspective.<sup>13</sup> Notably, social and environmental interests consistently encourage a framing of design problems and planning on an urban scale, instead of conceptualizing the design objects as functioning solely within the scales of the building. This example also highlights how mixing divergent approaches can generate conflicts between varied theoretic sources. The weakness in the conceptual mash-up in this case stems from what transitions researchers Smith and Stirling highlight in social-ecological systems (SES) literature as “understandably,” infrequent consideration of “the dynamics of technological change in any detail.”<sup>14</sup> Here, inadequately addressing the overlaid source material’s assumptions toward its field of interest (e.g., dynamics of ecological behavior) poses clear drawbacks to sustained mappings onto building and urban scale development processes. However, the case also highlights valuable, ongoing boundary work where issues of social justice, ecology, and the responsible use of resources mediate the design of buildings. In addition, the example illustrates issues specific to building design relationships, underscoring that further efforts need to be made in this area to flesh out building designers’ understanding of: “What conflicts exist when incorporating social science approaches into the inherently object-rooted endeavors of building construction and design?”

### **What Can Social Science Perspectives Add to Understanding Building Design?**

For architects, disciplinary boundaries are not always clearly defined. Practitioner, scholar, and large practice sustainability leader Ken Yeang observes that, “while the need to know originates in one discipline, the required knowledge itself often belongs to

---

12 Kate T. Fletcher and Philip A. Goggin, “The Dominant Stances on Ecodesign: A Critique,” *Design Issues* 17, no. 3 (2001): 15.

13 Sebastian Moffatt and Niklaus Kohler, “Conceptualizing the Built Environment as a Social-Ecological System,” *Building Research & Information* 36, no. 3 (2008): 248–68.

14 Adrian Smith and Andy Stirling, “The Politics of Social-Ecological Resilience and Sustainable Socio-Technical Transitions,” *Ecology and Society* 15, no. 1 (2010): 11.

many others.”<sup>15</sup> He continues, further elaborating the challenge facing building designers in the following statement:

The more we extend, the more we are also forced to trade off knowledge for data, exchanging theoretical concepts for hard facts.” As a result, architects often end up appropriating the knowledge from other disciplines as an ever growing database of strategies from which they can pick something that seems appropriate to the task at hand.<sup>16</sup>

Here, Yeang highlights that added complexity, whether in the form of technical, social, economic, or environmental issues, creates challenging conditions for those who design and construct buildings. His statement suggests that errors of overemphasis, omission, or even explicit misunderstanding in the process of knowledge appropriation in building design endeavors are not infrequent occurrences. However, what is also important to recognize is that neighboring fields, including the social sciences, make the same errors of overemphasis, omission, or inadvertently misread source material in their own genuine efforts to extend the understanding of the built environment. In the work of sociologist Thomas Gieryn, a central aim in social science inquiry is described as intending to reveal causal relationships embedded in social practices. Gieryn states that assessing the “recursive qualities” of the buildings through the use of the “theoretical orientation developed initially for the study of machines” is a means to rethink what buildings actually do, as opposed to what the design fields might claim.<sup>17</sup> However, the adopted mainstream social science reading of buildings as “technological artifacts, made material objects, and humanly constructed physical things”<sup>18</sup> lacks notable balance with longstanding traditions in the design discourses of architectural, landscape, urban design, and planning, which clearly contradict this perspective. It could also be argued that this approach omits a critical aspect of the object of study and instead reinforces problematic reductive notions of what the urban form comprises. Yet, despite these potential pitfalls, employing perspectives outside the fields of architecture and urbanism, that use differing analytic mechanisms and as a result produce alternate readings, can potentially highlight dominant framings within the respective fields. Centrally, comparative examination of where the emphasis is placed or omitted in framing perspectives yields a better understanding of analytical positioning:

The focus is on the recursive qualities inherent in technological artifacts, at once, the product of human agency and a stable force for structuring social action. Buildings, as any other machine or tool, are simultaneously the consequence and structural cause of social practices.<sup>19</sup>

---

15 Yeang, “Foreword,” vii-viii.

16 Ibid.

17 Thomas Gieryn, “What Buildings Do,” *Theory and Society* 31 (2002): 41.

18 Ibid.

19 Ibid., 41.

In this quotation, Gieryn stresses the relationship between social and technical aspects of an artifact, but neglects scale or specific functional markers that typically are critical typological identifiers in construction and design discourses. However, he also acknowledges that shortcomings exist in applying a social science approach to socio-spatial phenomenon and writes that “sociologists once believed that scientific truths ‘floated free in the air,’ detached from material moorings in the bodies of investigators, the wires and tubes of experimental instruments, or the doors and walls of laboratories.”<sup>20</sup> Continuing facetiously, he concludes: “sociologists could take buildings more seriously, but maybe not too seriously.”<sup>21</sup>

In addition to wry humor, Gieryn’s analysis also underscores what social science framings effectively address. For example, he describes how the iterative socio-material process during the design effort of a Cornell University biotechnology lab takes form in the interaction between participants of planning meetings and presentation renderings, and he draws attention to the ephemeral “shaping and editing” process that occurs during design processes.<sup>22</sup> This method of observation is of explicit use to the design fields because it empirically usurps the traditional assumptive notion of linear building design processes, which within the practice today still strongly relates to project pricing, public rollout, and delivery schedules. Similarly, researchers Guy and Farmer also recognize that the strategies proposed in conjunction with building development are constantly in the process of being shaped by many different actors, rather than solely determined by strict technological innovation or aesthetic or economic concerns. In their work, they show how framing perspectives categorically anchor differing architectural discourses, which in turn are linked to proposed solutions. Within each discourse the authors highlight what is considered “subjective” or “objective,” offering insight into how decision-making in proposals for the built environment can shift, depending on which framing mechanism is used.<sup>23</sup>

By treating these competing views as environmental discourses that take material form in the shape of buildings, we can recognize the tension between alternative environmental beliefs and strategies. Thus, by adopting an interpretative framework, and by exploring the notion of discourse, we highlight the social production of space, place, and the environment.<sup>24</sup>

The previous example of sociologist Gieryn’s work illustrates one of many social science efforts involving the superimposition of an external practice’s perspective (e.g., sociology, etc.) to the evaluation of processes within a separate practice (e.g., design of the built environment). In contrast, the collaborative work of academic architect Simon Guy and practitioner/researcher Graham Farmer

---

20 Ibid., 45.

21 Ibid., 65.

22 Ibid., 41.

23 Simon Guy and Graham Farmer, “Reinterpreting Sustainable Architecture: The Place of Technology,” *Journal of Architectural Education* 54, no. 3 (2001): 140–48, 141.

24 Ibid., 140.

locates their efforts from a vantage point distinctly within the field (e.g., by parsing specific rhetorical directions within the architectural discourse on sustainable buildings). However, they also use the social science analytic of discourse analysis in their work. Both approaches frame architectural complexity in the profession from alternate valid points of access and highlight how social science perspectives have the potential to add to the conceptual understanding of design endeavors and resulting outcomes. However, both approaches also raise additional queries, such as: What other fruitful points of analytic access exist? Could design processes benefit from an even closer social science orientation? If so, what might those benefits be? And what concepts have the most potential use? Keeping in mind how field framings can impact analysis of the built environment, the bridging concept of assemblage is discussed as having the potential to facilitate greater connectivity between perspectives on building design located within and outside the practice of architecture. In the following sections, the implications of the concept of assemblage thinking in relation to building design are comparatively traced within its root concepts: the social science perspective of STS, critical urban theory, and assemblage urbanism.

### The Process of Locating Emphasis

How do we take knowledge from another discipline, and adapt it to our own?<sup>25</sup>

Conceptually, assemblage is broadly accepted as a late twentieth century translation of the concept, “agencement,” from the work of scholars Deleuze and Guattari, whose “philosophical apparatus” has only been “partially linked” to the majority of current theoretic orientations using the term. For example, DeLanda’s focus on issues of social complexity and multiplicity falls more squarely within the vein of Deleuzo-Guattarian inquiry, than the work of Latour, Callon, and other scholars who focus on actor-network-theory, etc. However, assemblage continues to gain traction “in a descriptive sense, to describe the coming together of heterogeneous elements within an institution, place, built structure, or art form,”<sup>26</sup> and along these lines, it shows promise in the discussion of complex, multifaceted problems, such as sustainable development issues. Although as a concept it is no more critical than “notions like capital, labor, space, or urbanism,”<sup>27</sup> it does provide alternatives to the rigid prerequisites of network, class, and systems thinking, which prioritize organizational problem situations.<sup>28</sup> The potential of assemblage thinking in relation to the built environment appears to lay in its connective possibility beyond strict organizational or disciplinary concerns. However, to substantiate this claim, further inquiry is needed to locate its origins of thought and the potential assumptions they bring to building

25 Yeang, “Foreword,” vii.

26 Neil Brenner, David J. Madden, and David Wachsmuth, “Assemblage Urbanism and the Challenges of Critical Urban Theory,” *City* 15, no. 2 (2011): 227ff.

27 Colin McFarlane, “Assemblage and Critical Urbanism,” *City* 15, no. 2 (2011): 205.

28 Mattias Otto Müller, Stefan N. Grösser, and Silvia Ulli-Beer, “How Do We Know Who to Include in Collaborative Research? Toward a Method for the Identification of Experts,” *European Journal of Operational Research* 216, no. 2 (2012): 495-502.

design efforts. The following sections begin to explore the intersections between three central perspectives involved in current assemblage debates that focus on the built environment.

#### *Science & Technology Studies*

STS has been described as sharing a “basic disposition” within the constructivist tradition, where the normative or conventional boundaries between society and technology are dissolved.<sup>29</sup> Despite assertions that the field is anti-perspectivalist,<sup>30</sup> the philosophy of science and political scientist Landon Winner<sup>31</sup> suggests that two primary identifiable strategies are salient in the approach. The moderate views of scholars such as Bijker and Pinch “maintain the notion that society is an environment or context in which technologies develop;”<sup>32</sup> they incorporate a malleable view of the contexts in which knowledge is constructed and accept that a diversity of wholes can be generated from a heterogeneous mix of elements.<sup>33</sup> This view contrasts with the more extreme views of Callon and Latour, who assert that “the modern world is composed of actor networks in which the significant social actors include both living persons and nonliving technological entities.”<sup>34</sup> Centrally, STS work challenges Merton’s views that “research needs to be disentangled from the social and the psychological, and entangled solely with logic, with facts, and with methods for determining the facts.”<sup>35</sup> Much of the STS efforts have focused on the social context of scientific knowledge and suggests “that methods in natural science and social science barely catch their own performativity” and tend to distance themselves and their inquiries from “multiplicity, shape shifting and the indefinite.”<sup>36</sup> In STS “construction,” the emphasis is placed on the iterative, back-and-forth processes of how ideas are formed, with the recognition “that scientific knowledge and technologies do not evolve in a vacuum;” “rather, they participate in the social world, being shaped by it and simultaneously shaping it.”<sup>37</sup>

#### *Critical Urban Theory*

In contrast, the explicit focus of critical urban theory is distinctly different, engaging in the “politically and ideologically mediated, socially contested and therefore malleable character of urban space—that is, its continual (re)construction as a site, medium, and outcome of historically specific relations of social power.”<sup>38</sup> In Brenner’s view, critical urban theory recognizes inherited historical urban knowledge and its specificity,<sup>39</sup> which scholar Anique Hommels coins as the “obduracy” of the built environment.<sup>40</sup> She illustrates the concept by providing interconnected examples of where “existing urban formations,”<sup>41</sup> such as expansive roadway systems and the construction of public train systems by competing groups and to differing technical standards, can set the trajectory for subsequent respective but connected outcomes,

29 Mads Borup, Nik Brown, Kornelia Konrad, and Harro Van Lente, “The Sociology of Expectation in Science and Technology,” *Technology Analysis and Strategic Management* 18, nos. 3–4 (2006): 285–98, 287.

30 John Law, *After Method* (London: Routledge, 2004), 122.

31 Landon Winner, “Upon Opening the Black Box and Finding It Empty: Social Constructivism and the Philosophy of Technology,” *Science, Technology & Human Values* 18, no. 3 (1993): 362–78, 264–68.

32 *Ibid.*, 366.

33 Manuel DeLanda, *A New Philosophy of Society: Assemblage Theory and Social Complexity* (London: Continuum, 2006), 47–140.

34 Winner, “Upon Opening the Black Box and Finding It Empty,” 366.

35 Law, *After Method*, 17.

36 *Ibid.*, 122.

37 *Ibid.*, 12.

38 Neil Brenner, “What Is Critical Urban Theory?” *City* 13, nos. 2–3 (2009): 198.

39 *Ibid.*, 199.

40 Anique Hommels, “Studying Obduracy in the City: Toward a Productive Fusion Between Technology Studies and Urban Studies,” *Science Technology and Human Values* 30, no. 3 (2005): 323–51, 324.

41 *Ibid.* 324–29.

such as suburban housing models and difficulty in introducing effective public transportation or linking parts of existing systems. Fundamentally, a core aim of critical urban theory is to simultaneously highlight and critique “ideology (including social-scientific ideologies),” as well as “power, inequality, injustice and exploitation” in the urban context. The approach asserts “that another, more democratic, socially just and sustainable form of urbanization is possible, even if such possibilities are currently being suppressed through dominant institutional arrangements, practices, and ideologies.”<sup>42</sup> Although critical urban theory does not appear to share overtly rhetorical interests in the discussion on assemblage, theoretical discussions locating the interests of assemblage urbanism regularly include critical urban theory within their scope.

#### *Assemblage Urbanism*

Assemblage urbanism, described as being primarily concerned with the questions, “what is the city, what is urban life made of, how do cities organize collective life?,”<sup>43</sup> claims roots in both approaches, and tries to extend STS analyses beyond laboratory studies to the built environment while also claiming the theoretical stance that critical urban theory uses to ground its political and ideological motivations. Conceptually, the combination signals a compelling direction for the interests of both fields as a means to potentially open up alternate ways to understand the built environment and as a means to deepen the understanding of what constitutes meaningful contextual process. Assemblage urbanism blends STS constructivist approaches with the agenda of critical urbanism, with its aim being to “move away from a notion of the city as a whole to a notion of the city as multiplicity, from the study of ‘the’ urban environment to the study of multiple urban” assemblies.<sup>44</sup> Brenner et al. summarize the beneficial uses of assemblage urbanism, outlined in McFarlane’s 2011 text, as follows: 1) as a descriptive empirical tool to aid in understanding how existing urban configurations are composed, 2) to raise researchers’ awareness of the “problematic of materiality,” and 3) as a means to encourage critical future visions of the city imbued with “a political sensibility containing a distinctive image of the desirable city-to-come.”<sup>45</sup> Assemblage urbanism looks to combine strands of constructivism in the first two points with the critical urbanist agenda of the third.

The melding of social constructivist and urban scale-focused approaches potentially addresses the criticisms leveled against each respective body of scholarship. Specifically, in critical urbanism, the weakness voiced has been in its assumptive stance of dialectics in relation to capitalist development, which presumes to represent “the whole of the process” and requires a “necessary causal relationship between content and action.”<sup>46</sup> In constructivist approaches, both veins have come under heavy criticism from

---

42 Brenner, “What Is Critical Urban Theory?,” 198.

43 Ignacio Fariás, “The Politics of urban assemblages,” *City* 15, nos. 3–4 (2011): 367ff.

44 *Ibid.*, 369.

45 Brenner, Madden, and Wachsmuth, “Assemblage Urbanism and the Challenges of Critical Urban Theory,” 228ff.

46 McFarlane, “Assemblage and Critical Urbanism,” 211.

Winner for “almost total disregard for the social consequences of technical choice.” In particular he critiques an overrepresented focus on innovation, favored conceptions of which actors are involved in social processes, as well a limited approach to the “dynamics evident in technological change.”<sup>47</sup> Meanwhile, sociologist and historian of science Olga Amsterdamska critiques their tendencies toward postmodern absurdist relativism.<sup>48</sup>

Thus, not surprisingly, combining the approaches also has its challenges, as evidenced in debates concerning how the concept of assemblage should be rightfully deployed: as an empirical description, a methodological tool, or an ontological perspective. Specifically, the intent to apply assemblage thinking ontologically to urban issues has been flagged as deeply problematic for the vagueness of its claims by proponents of theories oriented by institutional class, such as critical urbanism.<sup>49</sup> Researcher Ignacio Fariás argues that:

If we stick to assemblage thinking in its Deleuzian inspiration (DeLanda, 2006; Deleuze and Guattari, 1987), or to the version of it we find in actor-network theory (Latour, 2005b), that is, as an ontological argument, this [approach] has only little if anything in common with the Marxian inspired project of critical urbanism....<sup>50</sup>

The author continues asserting that assemblage approaches significantly diverge from the “notion of power as a resource a ruling class possesses and of knowledge as an ideological construct” needing to be revealed, and that critical urbanism does not reflect the “engagement with the world that ANT and other assemblage perspectives” represent.<sup>51</sup> Parallel to this view, McFarlane describes the interaction of assemblages as “a symbiosis defined less by conflict and contradiction and more by the lines of flight that run through them, where ‘line of flight’ names the possibility of creating something new.”<sup>52</sup> In this regard, Brenner et al. acknowledge the potential to provide “some important new prospects onto the urban question,” although the authors also express concern regarding the ambiguity of the aims of assemblage and ask whether it elects “to deepen, extend, transform or supersede the analysis of capitalist structururations of urbanization.”<sup>53</sup>

The line of Brenner et al.’s critique logically follows their position as critical urbanists, but it overlooks the problems that arise from assemblage urbanism’s mix of both types of constructivism found in STS. McFarlane acknowledges that assemblage urbanism resonates more strongly with the more radical form of constructivism, along the lines of Latour and Callon, but with two exceptions:

First, more than ANT, assemblage, due to its focus on relations of exteriority, attends to the agency of the interactions and the component parts, rather

---

47 Winner, “Upon Opening the Black Box and Finding It Empty,” 368.

48 Olga Amsterdamska, “Surely You Are Joking, Monsieur Latour!,” *Science, Technology & Human Values* 15, no. 4 (1990): 495–504.

49 Brenner, Madden, and Wachsmuth, “Assemblage Urbanism and the Challenges of Critical Urban Theory,” 236–38.

50 Fariás, “The Politics of Urban Assemblages,” 365.

51 Ibid.

52 McFarlane, “Assemblage and Critical Urbanism,” 211.

53 Brenner, Madden, and Wachsmuth, “Assemblage Urbanism and the Challenges of Critical Urban Theory,” 230.

than the former alone: The agencies of the assemblage's human and nonhuman parts are not exhausted by the interactions alone.<sup>54</sup>

Second, assemblage urbanism accepts "the possibilities of human and nonhuman relations holding together in uneasy interactions,"<sup>55</sup> and this perspective recognizes the subsequent consequences of physical interventions.<sup>56</sup> Given the interest in assemblage urbanism to overlap with the social justice agenda of critical urbanism, in which historical formations are important, the seemingly contradictory desire to locate assemblage urbanism in close proximity to Actor Network Theory is necessarily mediated by more moderate forms of STS constructivism.<sup>57</sup> In addition, despite Latour's keen observation that unless "a way to do for buildings the reverse of what Marey managed to do for the flights of birds and the gaits of horses" is found, "architectural theory will be a rather parasitical endeavor that adds historical, philosophical, stylistic, and semiotic 'dimensions' to a conception of buildings that has not moved an inch,"<sup>58</sup> superimposing a strictly ontological constructivist ANT-based reading onto activities in architecture and urbanism is potentially reductively problematic in a singularly critical dimension. Specifically, as Reinhold Martin points out, "for Latour as for so many others, the problem of postmodern semiotics is that its signs (and we must assume, its decorated sheds) are insufficiently real."<sup>59</sup> Another well-known example of this tension is evident in an exchange between scholars, in a discussion surrounding the interpretation of a series of bridges constructed by divisive New York planner Robert Moses, which sparked an academic debate in the early 1990s that, according to Winner, inadvertently highlights the "political naïve" conclusion-making of STS constructivism, evident "through the use of postmodernist interpretive irony."<sup>60</sup> Winner argues that public infrastructure was constructed in part to segregate the city, which can be traced through the effect of the role of bridges in the city, as well as, the documented personal history of Moses during this particular political period. Woolgar counters that a "measure of impartiality" resides in readings of the structure outside a political artifact, and that Winner's reading introduces a prejudicial analysis. Winner concedes that of course multiple readings of text/technologies are valid analytically, but that it is "wrong to suggest that the issue is simply not decidable" in terms of what is socially just.<sup>61</sup> As a debate that perpetually reemerges,<sup>62</sup> the discussion hints at the potentially problematic ambiguity in assemblage urbanism's outlined agenda, which like the constructivism Winner critiques, fails in its current form to "move beyond elaborate descriptions, interpretations, and explanations to discuss what ought to be done."<sup>63</sup>

54 McFarlane, "Assemblage and Critical Urbanism," 215.

55 Ibid.

56 Hommels, "Studying Obduracy in the City," 324-29.

57 Ignacio Fariás and Thomas Bender, eds., *Urban Assemblages: How Actor–Network Theory Changes Urban Research* (New York: Routledge, 2010).

58 Bruno Latour and Alben Yaneva, "Give Me a Gun and I Will Make All Buildings Move," in *Explorations in Architecture: Teaching, Design, Research*, Reto Geiser, ed. (Basel: Birkhäuser, 2008), 88.

59 Reinhold Martin, "Postmodern Precision? The Science of Images," in *Precisions: Architecture Between Sciences and the Arts*, Ákos Moravánszky and Ole W. Fischer, eds. (Berlin: Jovis Verlag, 2008), 97.

60 Winner, "Upon Opening the Black Box and Finding It Empty," 374.

61 Ibid.

62 Langdon Winner, "Do Artifacts Have Politics?" *Daedalus* 109, no. 1 (1980): 121-36; Bernward Joerges, "Do Politics Have Artefacts?" *Social Studies of Science* 29, no. 3 (1999): 411-31; Steve Woolgar and Geoff Cooper, "Do Artefacts Have Ambivalence? Moses' Bridges, Winner's Bridges, and Other Urban Legends in STS," *Social Studies of Science* 29, no. 3 (1999): 433-44.

63 Winner, "Upon Opening the Black Box and Finding It Empty," 374.

## Conclusion

Architectural building design has a long tradition of drawing inspiration from and aspiring to balance environmental, social, and technical aims in its aspirations for the built environment. However, in modern practice with green ambitions, these interests are often skewed toward primarily technical considerations within the building scale.

Most buildings are no longer simple vessels, shells formed around use, but machines of enormous complexity, coursed through by numerous systems that control the environment of its interior and connect it to the external world.<sup>64</sup>

This quotation from architects Kieran and Timberlake highlights the reality of the growing complexity of technical building installations, but it also supports the assertion that the increasing weight of technology-related considerations in building design tends to dominate the process, even when environmental interests are placed in the foreground during programming and conceptual design. In the previous sections, combining the aims of building design with social science approaches highlights a variety of ways to engage complexity, and in each example, it is the urban scale that is intended to represent *the collective interest* and links the analytic framings. Shifting the emphasis to the social in the analysis of building design has been shown to shed light on research topics ranging from the production of knowledge shaped by spaces within buildings,<sup>65</sup> to how the design of the built environment relates to concerns of social justice, as well as how the construction of design discourse relates to proposed building solutions.<sup>66</sup> At a time when ideas of urbanity are being rethought globally, and as buildings and how we produce them begin to change, so will the professions affiliated with their design.

As a problem orientation, assemblage thinking has the potential to act as a conceptual design umbrella across professions and design scales. In the endeavor to build responsibly, designers face genuine challenges in reflexively developing and implementing solutions that support the facilitation of nothing short of a revolution in the way the built environment is conceived, constructed, maintained, consumed, destroyed, and reused. Yet to actively participate in shaping the agenda for our globally interconnected urban landscape, the inherently mixed character of design must be analytically explored to the fullest extent to achieve what Frampton refers to as “the realization of certain expressive vales.”<sup>67</sup>

---

64 Kieran and Timberlake, *Refabricating Architecture*, 29.

65 Karin Knorr Cetina, “Laboratory Studies. The Cultural Approach to the Study of Science,” in *Handbook of Science and Technology Studies*, Sheila Jasanoff et al., ed. (Thousand Oaks, CA: Sage, 1995), 140–66.

66 Graham Farmer and Simon Guy, “Hybrid Environments,” in *Sustainable Architectures: Cultures and Natures in Europe and North America*, Simon Guy and Steven A. Moore, ed. (New York: Spon Press, 2005), 15–30.

67 Kenneth Frampton, ed., *Technology, Place and Architecture* (New York: Rizzoli, 1998), 13.

The ongoing discussions at the crossroads between STS, critical urban theory, and assemblage urbanism suggest that stronger engagement with the interests of the social network of actors surrounding built environment case studies could facilitate alternate readings of what occurs during design processes and could more accurately reflect the varied and “continuous process of learning and adaptation.”<sup>68</sup> Centrally, revealing the intersections between these approaches yields benefits similar to what DiSalvo observes in the construction of publics, where “the opportunity to contribute to an emerging, reinvigorated discourse on the public occurring across the arts, humanities, and social sciences,” can “offer a position from design studies that expresses a distinctly intimate knowledge of the made and the making of things.”<sup>69</sup> In addition, specifically within the publics constructed around the discourse of built environment sustainability, critical interactions between green design interests and collective political action could be further articulated. Insofar as the approach emphasizes processes of reanimating the interaction between roles previously seen as static, assemblage thinking is recognized as a useful analytic lens through which the multiplicity of design practice can be meaningfully reconsidered.

68 Daniel Christian Wahl and Seaton Baxter, “The Designer’s Role in Facilitating Sustainable Solutions,” *Design Issues* 24, no. 2 (2008): 72.

69 Carl DiSalvo, “Design and the Construction of Publics,” *Design Issues* 25, no. 1 (2009): 49.