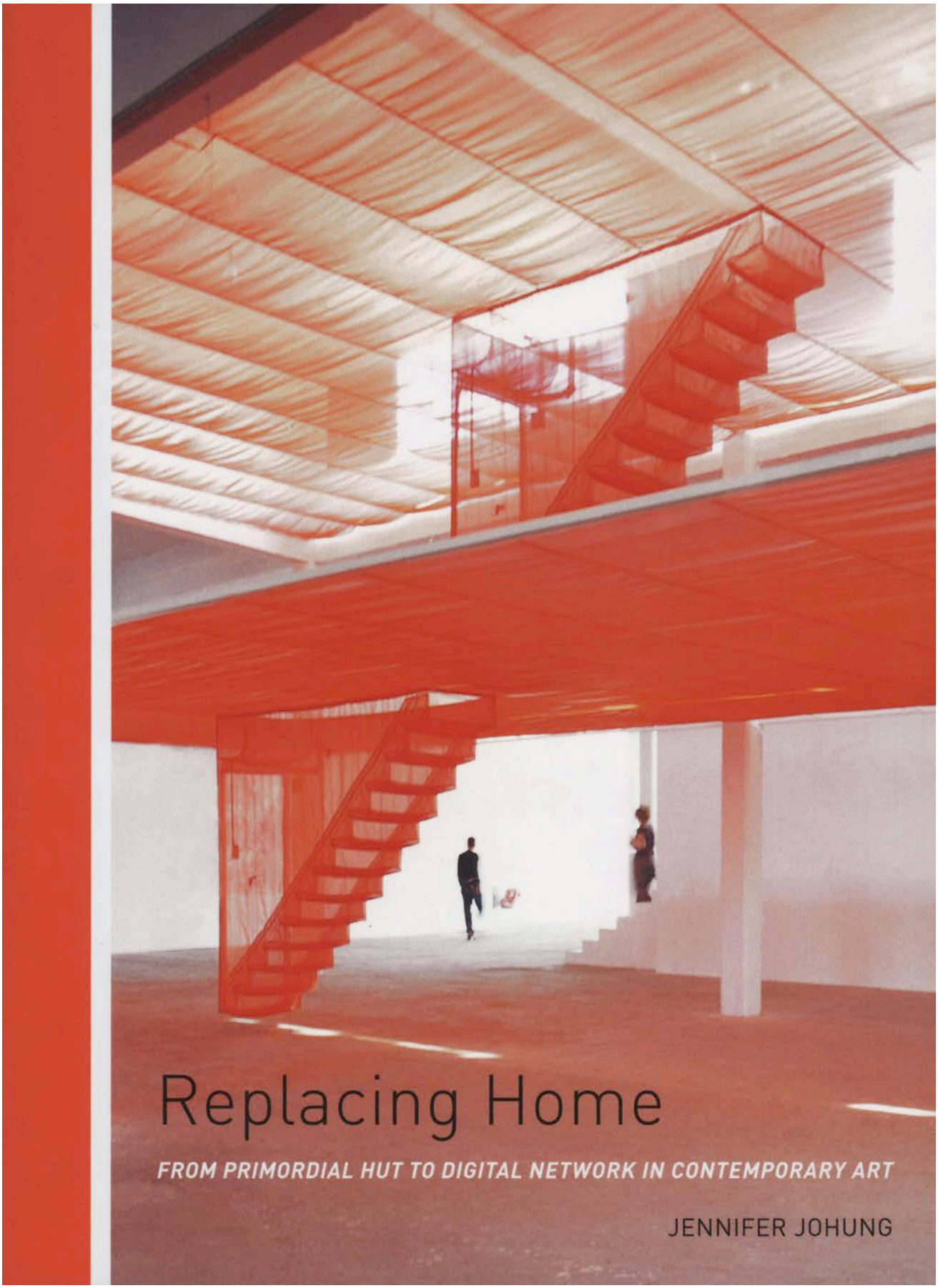




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Five

# NETWORKED DEPENDENCIES RAFAEL LOZANO-HEMMER'S *RELATIONAL ARCHITECTURE*

On a clear night between December 26, 1999, and January 7, 2000, those walking through Mexico City's central square, formally titled La Plaza de la Constitución but commonly called el Zócalo, could look up and see a tangled net of piercing bluish-white searchlights stretching overhead as far as ten to twenty kilometers. Some passersby could even say that they had in fact designed a particular light-beam configuration, a new one transforming the night sky every six to eight seconds, illuminating the surrounding National Palace, municipal buildings, the Metropolitan Cathedral, the Supreme Court of Justice, and the Templo Mayor Aztec ruins. Each of these designs formed a part of *Vectorial Elevation*, an interactive Web- and site-based installation devised by new media artist Rafael Lozano-Hemmer and commissioned by the Mexican Culture Council for the city's millennium celebration (Figure 5.1).

Working with designers and technicians from four countries,

FIGURE 5.1. Rafael Lozano-Hemmer, *Vectorial Elevation*, Mexico City, 1999–2000. Photograph by Martin Vargas.



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Lozano-Hemmer developed a three-dimensional interactive simulation of the Zócalo located on the project's Web site, www.alzado.net. In order to afford wider access to the site, Internet stations were made publically available on the Zócalo and around the country, mainly in museums and libraries. The interface offered online participants the ability to remotely control eighteen robotic searchlights placed on the rooftops of the buildings around the square. Participants could select each searchlight by clicking its simulated position, all the while navigating a three-dimensional visualization of their design in process. Target points where the selected light beams intersected allowed participants to move a number of beams at once, as well as to randomize, raise, lower, rotate, and/or invert their patterns incrementally. Once satisfied, the participant would submit the finished design online to be physically rendered in Mexico. Connected by data cables and located by GPS trackers, the searchlights in the square were then positioned by a DMX lighting controller, usually used to manage stage lights, that continually produced each new design before fluidly moving on to the next one (Figure 5.2).

The site, which also included a live video of the changing designs from an aerial perspective and detailed information on each of the buildings, received eight hundred thousand visits from a total of eighty-nine countries, although 70 percent of the participants were from Mexico. Thanks to heavy local media coverage, almost everyone was aware that the searchlights were controlled by computers, and most knew about the Internet participation. Speaking on video to Lozano-Hemmer as he documented the project, those in the Zócalo commented on the work's technological and architectural aspects, as well as on its spectacular nature. Some crossing the square at night thought the lights looked like "a constellation," while others thought the beams formed a "roof" or a "dome" above them. For one woman, the designs turned the Zócalo into a "Mexican Hollywood" (Figure 5.3).[1]

In fleeting instances, the public square thus became many things to many people who moved through different real and virtual spaces, interacting either proximately or remotely in both planned and accidental encounters. Lozano-Hemmer does not predict who will connect and how, and he certainly

FIGURE 5.2. Rafael Lozano-Hemmer, *Vectorial Elevation*, Vitoria-Gasteiz, Basque Country, Spain, 2002. Photograph by David Quintas.

does not force these connections—that may happen by chance. But his work does provide the initial conditions that open and close a variety of access points, moments of pause, and sites of connection, allowing each of us to find ourselves in place with the help of others. Both individual and collective moments and sites of connection are in turn often coincidental and, more often than not, happen unexpectedly. In projects such as *Vectorial Elevation*, participation in the emergence of a continuously rematerialized, newly accessible

FIGURE 5.3. Rafael Lozano-Hemmer, *Vectorial Elevation*, Mexico City, 1999–2000. Photograph by Martin Vargas.



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environment yields these embodied meeting points that are dispersed over time, and over real and virtual spaces. These interactions based on varied levels of participation instigate modes of engaging collectively, though not equally, in the framing of both public and private spaces, and the determination of who gets to use and belong within those sites.

Although Lozano-Hemmer does not overtly attend to or offer structures of home, his attunement to the challenging social efficacy and parameters of participation does put pressure on my concept of a socially engaged program of replacing home to approach a politics of replacing. When considering the ways in which home is offered, such a politics must attend not only to what is being, should be, or can be replaced but must also care for the ways we are able to enact a process of replacing, what that process entails, who gets to be involved, and who does not. While the previous chapter affirms a program of replacing home that depends on public visibility and action as well as on the continual specification and replacing of collectivity, this chapter considers the processes through which social coherence is continuously reactualized. I propose a concept of replaceable collectivity that is purposively asymmetrical and oftentimes accidental, that is made possible by changing dependencies among bodies, environment, and technology, and through which individuals may uncover for themselves and for others the materials and systems of belonging with each other, in place and at home.

## RELATIONAL NETWORKS

For the past ten years, Rafael Lozano-Hemmer has been developing large-scale interactive installations and responsive environments that he calls "relational architecture." *Vectorial Elevation* was Lozano-Hemmer's fourth instantiation of relational architecture, debuting in Mexico City and later reinstalled for the opening of the Basque Museum of Contemporary Arts in Vitoria, Spain, in 2002, with 300,000 participants, at the Fête des Lumières in Lyon, France, in 2003, with 600,000 participants, and for a celebration in Dublin of the European Union's expansion in 2004, with 520,000 participants. Using

robotics, projections, the Internet, cell phone links, sensors, and custom-made interfaces, Lozano-Hemmer's "architecture" intervenes into public spaces—a parasite that layers itself over existing buildings or embeds itself in expansive plazas, interacting with those bodies who have access to the site and proposing alternative uses for those who may not. Lozano-Hemmer defines *relational architecture* as "the technological actualization of buildings with alien memory."[2] Using alien instead of new to describe his interventions, he avoids the assumption of originality, of a break in which something ends and something begins. Rather, alien memory refers to something that already lingers in the space, that is carried by those who use or misuse the structure, that is traced by those who pass into and out of the space in both past and present time. It is a thought, an action, or a person that does not belong, is out of place, and that can be reactualized through technological networks that engage participants both on and off site, in both close and remote contact with technology and with each other.

Because relational architecture seeks to rematerialize various misplaced objects, persons, or experiences hidden within the site, it distances itself from virtual architecture, even if the two may often share technological constructs and information processes. Although Lozano-Hemmer is careful to admit that relational and virtual architectural concepts are not mutually exclusive or opposing practices, their point of difference hinges on the experience of human bodies within technologically enhanced environments that are a mixed reality of the actual and the virtual. Virtual architecture, rendered for example, in CAVEs (Cave Automatic Virtual Environments) or HMDs (Head-Mounted Displays), depicts familiar landscapes and structures that become accessible to participants either in the same way that they might likely be outside the virtual reality or as fantastic images that afford users extraordinary powers. While the user is within this virtual environment, the outside world also remains the same. Of course this is a crude generalization, but the point I want to make is that Lozano-Hemmer's relational architecture, in contrast, temporarily replaces actual buildings, re-presenting alternative and alien uses through the participants' negotiation of the buildings' virtual sites.

Users become participants, as their accustomed interactions within real spaces are momentarily rerouted and they become linked with others, both online and on the ground.

While inclusive of virtual simulations, relational architecture ultimately aims for a "dissimulation," or a revealing of that which does not belong in the structure or on its site. For Lozano-Hemmer:

> Virtual buildings are data constructs that strive for realism, asking the participant to "suspend disbelief" and "play along" with the environment; relational buildings, on the other hand, are real buildings pretending to be something other than themselves, masquerading as that which they might become, asking participants to "suspend faith" and probe, interact and experiment with the false construct.[3]

Instead of participants pretending to be something they are not, now buildings are the ones masquerading, to use Lozano-Hemmer's word, where the aim is not to mask but, rather, to unveil future uses and misuses of both structure and site. Relational architecture masquerades in order to open up the possibility for new experiences within the spatial environment by providing the conditions for two specific kinds of buildings to pretend to be what they are not. Lozano-Hemmer identifies *default buildings* as architecture that is generic, featureless, and whose structures are cropping up around the globe—one indistinguishable from the next. Relational architecture temporarily localizes the spatial situation and specifies the embodied experience of these kinds of buildings. In addition, relational architecture also confronts *vampire buildings,* so called by the Spanish architect Emilio Lopez-Galiacho. Vampire buildings are those that are immortalized through restoration, and that are monumentalized and protected against erosion.[4] Relational architecture seeks to mask over these buildings to reintroduce life, and thus change, death, and possible reincarnation, into these sites. An architectural masquerade is therefore a performance of concealing and revealing, a process that reimagines and momentarily replaces the spatial environment by reintegrating its participants in real time and across a variety of competing, palimpsestic spaces.

Lozano-Hemmer is also careful to distance his practice from a kind of site-specific art that acknowledges the spatial specificities of the locale alone. Taking on a "temporary specificity" that is not only site-bound, Lozano-Hemmer's architecture is, rather, "relationship-specific," meaning it focuses on the tenuous, temporary relationships between the site and its ever-changing public, and the microhistories and politics that are traced through that space. "I am very committed," Lozano-Hemmer says, "to the idea that a site consists of an indeterminate number of intersecting imaginary, socio-political, physical and tele-present spaces. . . . What is specific is the new behaviors that might emerge during interaction."[5] Relational architecture thus activates static, often ominous public buildings and inaccessible spaces so that, in his words, "the input of the people in the street can provide narrative implications apart from those envisioned by the architects, developers or dwellers."[6] Intervening in these monumental structures, Lozano-Hemmer creates what he appropriately calls "anti-monuments," which are not structures but instead actions that allow people to take part in a revisualization and ultimately a reembodiment of their spatial surroundings.[7] In fact, in 2002, Lozano-Hemmer redefined relational architecture as "anti-monuments for public dissimulation."[8] The antimonument as action suggests alternatives to the fetishization of the static site that Lozano-Hemmer links to status quo representations of cultural and economic power. Refusing to contribute to the immortalization of architectural structures or to the collection and dissemination of art objects, he instead focuses on offering the conditions for social experiences (Figure 5.4).[9]

The nature of these social experiences is what connects Lozano-Hemmer's relational architecture to the relational art that shares its name. Gathering together contemporary 1990s art installations under the name of *relational aesthetics,* art critic Nicolas Bourriaud has indicated a contemporary trend toward art events and procedures such as exhibition openings, invitations, casting sessions, as well as areas for eating, chatting, and dancing. Without considering the social, economic, and political variables that may not afford egalitarian access or participation in such events, Bourriaud's categorization of the art installation as "social interstice" places new emphasis

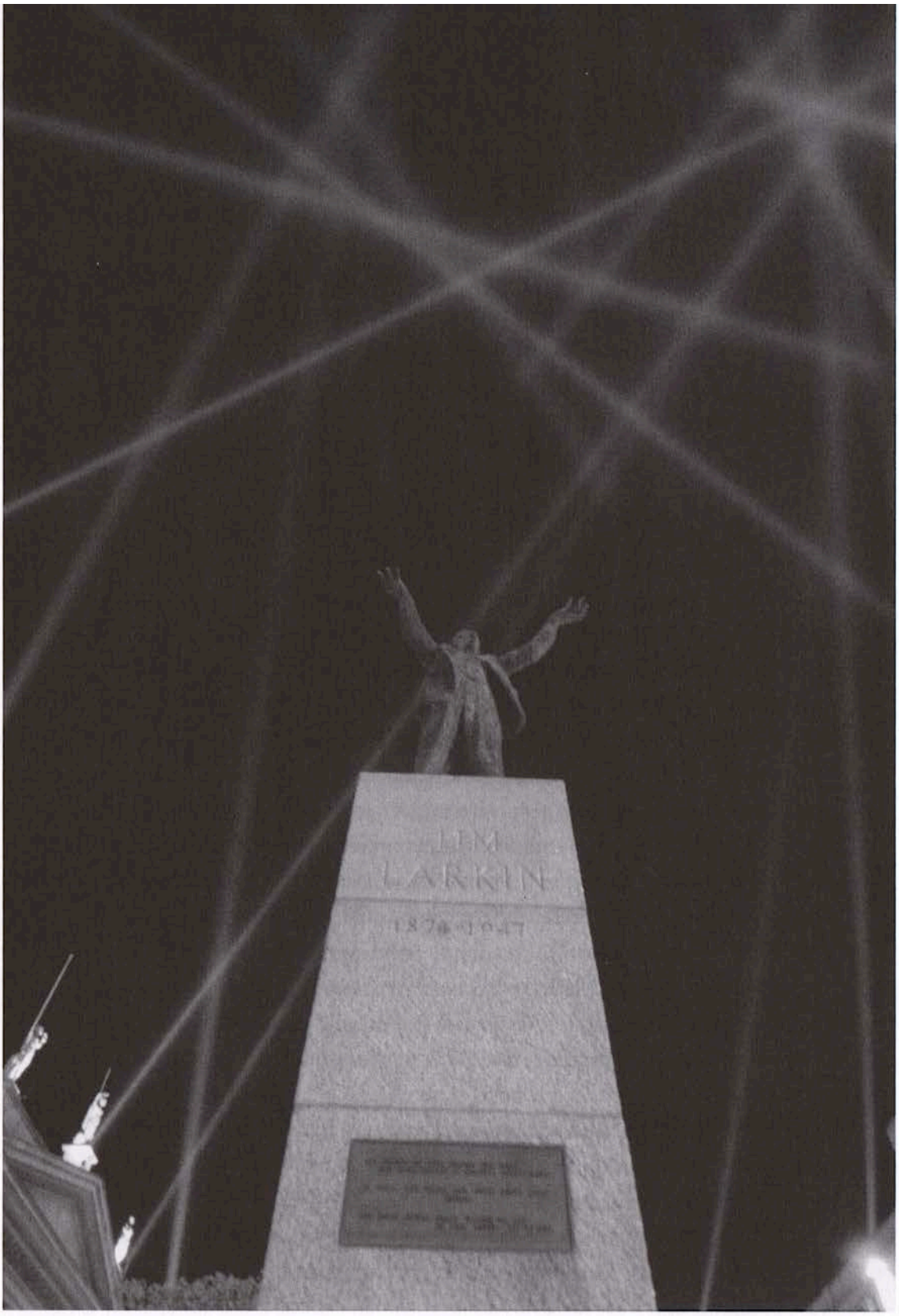


FIGURE 5.4. Rafael Lozano-Hemmer, *Vectorial Elevation*, expansion of European Union Celebrations, O'Connell Street, Dublin, 2004.



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on the coming-together and coming-apart of participants across temporarily constructed sites.[10] Lozano-Hemmer's own relational architecture is user-activated and self-organizing, catalyzing multiple interactions with buildings, bodies, real spaces, and digital sites. Expanding on Bourriaud's qualification of relational practices, Lozano-Hemmer's relational architecture provides the conditions for events that happen in multiple fields that in turn resonate in several sometimes unpredictable and usually temporary places within its expanded real and digital network.[11]

Alongside its comparative association with relational artworks, relational architecture is also indebted to the structure and system of self-organizing biological networks. Noted by Lozano-Hemmer as foundational to his practice is Chilean biologists Humberto Maturana and Francisco Varela's study of autopoiesis, which explains the networked unity of structure and function in natural living systems—a unity that is defined through cellular components that continuously regenerate the network of relations that produced the system in the first place.[12] In order to arrive at the contemporary significance of the biological network as model for relationality, Mark C. Taylor demonstrates a movement from networked mechanization, influenced by modern industrial developments, to network culture, as influenced by contemporary communication technologies. The crucial cultural turn is from a mechanistic to an organic system of representation, organization, and experience. Considering Kant's *Critique of Judgment,* Taylor marks a significant moment in the Third Critique in which Kant analyzes the difference between mechanisms and organisms. According to Kant, the cause and effect, along with the means and ends, of mechanisms are externally related. Organisms, on the other hand, are self-organizing and integrated. They emerge from within an interplay of component parts and a systematically unified whole and are thus mutually constitutive.[13]

Indicative for Kant of "self-organized being," the reciprocal relation between parts and the whole has begun to be structurally explored by biochemists and theoretical biologists, such as Maturana and Varela. Their autopoetic understanding of biological systems emphasizes a self-reflexivity in

which an organism "continuously generates and specifies its own organization through its operation as a system of production of its own components, and does this in an endless turnover of components under conditions of continuous perturbations and compensation of perturbations."[14] However, the assumption that autopoetic systems are self-contained and therefore closed and complete need not carry truth, as such systems also seem to be necessarily implicated within, and must depend on, other external networks of organization.

In order to elucidate this logical catch, Taylor turns to the writing of sociologist Niklas Luhmann in order to expand on Maturana and Varela's biological autopoetic network, making it applicable to social and communication systems. According to Luhmann, autopoetic systems are both open and closed, and it is this interplay between the two that brings about an interaction between the system and the specific surroundings within which it self-operates. As Taylor concludes: "It is precisely the necessary relation to the environment that keeps the recursivity of the autopoetic system from completely closing in on itself. This is an important point, because Luhmann believes that it prevents autopoetic systems from becoming repressive totalizing structures."[15] Such an argument is applicable to contemporary communications networks and the socially organizing principles that they support. Our ever-advancing present-day technologies also arguably operate like biologically autopoetic systems, in which component parts are self-organizing, self-regenerating, and self-reflexive within a greater whole. Yet similarly in order to retain the possibility of openness and thus of endless variation and adaptability, digitally networked relations must also engage with their social and spatial environments, so as to remain capable of regeneration, revision, and indeed replacement.

This is a direct concern of Lozano-Hemmer's, as he translates organically self-structured and contextually variable relationality into architectural practice. Named architecture though rendered in a form primarily understood as installation art, the work of Lozano-Hemmer is situated disciplinarily between architecture and performance. In its attention to processes of embodied presence, interaction, and activity in real time and across a variety of real and virtual spaces, his relational architecture can be experienced as performance.

But what does it mean for a digitally enhanced, organically structured network that unfolds in time and that is based on spatial and phenomenal relationships to be qualified as architecture? If not offering material structures capable of habitation or protection, then what does this architecture-as-network propose in terms of experiences of belonging? How can digital networks take part in contemporaneously replacing both public and private experiences of home?

A network can most generally be defined as a system for organizing and structuring the relationship between things, whether they are biological components, people, objects, or information. Further specified by architectural and new media theorists Anthony Burke and Therese Tierney:

> Networks consist classically of nodes, or non-dimensional points of connection, and links, equally non-material connections that usually conform to one of several organizational topologies such as centralized, distributed, bus, or mesh, which affect the nature of the relationships they embody and how they may be analyzed and understood.[16]

Networks are thus qualified and differentiated by their ability to perform flexibly, interrelationally, and organizationally. With relational methods of collection and allowances for infrastructural variation provided by advances in mathematics and mobile telecommunications, networks have become the central organizational model of our contemporary moment.

The associations between networks and architecture are not, however, new. As architectural theorist Mark Wigley points out, the associations among networks, spatial organization, and architecture are historically far-reaching, in play well before developments in digital information culture. In order to contextualize Lozano-Hemmer's relational architecture within a wider framework of networked situation and belonging, I want to take a short detour through architecture's theoretical and material intersections with the network in order to plot out prior formulations of networked relationality that have influenced our contemporary structures and systems of being in place with others. Wigley has already taken up this task, and he provides the following overview:

> The ancient forms of the word "network" were applied at once to the work of humans and that of animals—as in fishing nets and spiders' webs. In the eighteenth century, it was common to use the word to describe the inside of the body itself, as in the organization of veins, muscle bundles, etc., and in the nineteenth century it was a standard label of systems of rivers, canals, railways, cables, electricity, sewers, etc. Finally, it gets applied to organizations of immaterial things like property and groups of people. The word slides seamlessly from biology to technology to society.[17]

With this trajectory in mind, I would like to focus on the development of mechanistic and organic models of networked relationality taking place from the nineteenth to twentieth centuries, particularly as such developments have affected the structural design and embodied experience of architecture and urban space.

Modern architectural historian Sigfried Giedion identifies nineteenth-century industrial developments as central to a very modern determination and experience of space—one that foreshadows a networked determination of the spatial environment. In fact, Giedion's proposed harmony between architecture and the new realities of industrial, technological, and scientific advancements charts a legacy that still remains important today. Developed between 1850 and 1890, iron changed architecture from a craft to an industrial production. For Giedion, this shift in the engineering process of construction also articulated a shift in architectural vision. The introduction of iron in roof framings and skeletal supports demanded a more complex and fluid balance of forces rather than the previously rigid plan of load-bearing structures. "Iron," wrote Giedion, "opens up spaces."[18] The new material therefore offered new design possibilities, allowing a previously unthinkable partnership with glass to create the greatest possibility for transparency and horizontal suspension.

By foregrounding the shift in aesthetic considerations in the face of the changing material landscape, Giedion also shifted the focus of architectural theory from the nineteenth-century architectural object to the twentieth-century modern observer and user of the built space. For Giedion, both the

construction and experience of built forms could in fact be predicated on the moving body of the observer in relation to the built environment.[19] This mobile determination of architectural space, afforded through the use of materials and methods perfected at the end of the nineteenth century, formed the basis of Giedion's most influential modern "space-time" conception. This space-time experience of the environment can, in turn, be linked to a networked organization in which body, object, and landscape are mutually constitutive, self-organizing, and adaptable.[20]

Identifying the movement of the observer around and within a built space as no longer fixed to any linear axis or geometric structure, Giedion's conception results in an experience of space that is also no longer a product of an orderly or rational sequence of movements. Indeed, as early as 1928, Giedion was differentiating between the earlier "rigid-feudal projects" and modern architecture's "living projects" that organically integrated themselves within their surrounding landscape and were designed in response to both the circulation of traffic around their outer facades as well as through their inner divisions.[21] This linking of bodily movement and spatial organization actualizes a relational logic that in turn determines material building practices. For key modern architects Le Corbusier, Walter Gropius, and Mies van der Rohe, whose built projects were central to Giedion's thinking, the body in flux constructs a variable understanding of space as a responsive and adaptable network.

By the twentieth century, then, the horizontally expansive network of infinite flows and meeting points had become integrated into the construction of buildings themselves. As Mark Wigley describes it: "Interiors became circuits. Flow on the outside ever more seamlessly merged into flow on the inside until the line defining the limit of the building became paper thin."[22] But as Wigley contends, it was not until the experiments in architectural dematerialization by such international collectives as Archigram and Superstudio in the late 1960s and 1970s that the network as both structure and system became the ultimate symbol, not only of spatial construction but also of embodied situation within the spatial environment. Both architectural groups

aimed to resituate bodies within nodes and lines of linkage by exploring the disappearance of static built foundations and by expanding the conventional parameters of architectural practice away from its unquestioned commitment to the solid, fixed site.

For its part, the British collective Archigram attempted to bring to completion modern architecture's goal of constructing self-organizing and self-sustaining machines for living. Archigram's self-titled newsletter—the nine main issues of which were published between 1961 and 1970—introduced the paper-based designs of core members Warren Chalk, Peter Cook, Dennis Crompton, David Greene, Ron Herron, and Michael Webb. Archigram turned to the potential of emerging technology to imagine deformations and non–object-based networks that lay beyond architecture's structural sites. Their unbuilt projects, such as Peter Cook's 1964 "Plug-In City," David Greene's 1966 "Living Pods," or Michael Webb's 1966 "Cushicle/Suitaloon," as we saw in the previous chapter, revealed "a sublime world of pure servicing, information, networking, transience," in architectural historian Simon Sadler's words.[23] With their interest in systems and flow in ever-emergent spatial situations, Archigram's notations, proposals, and plans sought to dematerialize the walls, floors, and ceilings of architecture, uprooting them, on paper at least, from their ties to spatial enclosure, and initializing a legacy, as Sadler articulates, of "event-based architecture."[24]

Alongside Archigram, the experimental Italian architecture collective Superstudio was also investigating the dematerialized site as network. Led by Adolfo Natalini, Superstudio started in 1966 to produce a body of work that envisioned, again primarily on paper, an antiarchitectural utopia in which repressively fixed architecture and seemingly unavoidable consumer objects would be nonexistent. Instead, Superstudio imagined the world as one continuous circuit board, as exemplified by their 1972 "Supersurface," which rendered the surface of the globe as a horizontally expansive and ever-accessible grid. Natalini aimed, in his own words, for "the elimination of the city as hierarchy and social model, looking for a new free egalitarian state, in which everyone can reach different grades in the development of his pos-

sibilities, beginning from equal starting points."[25] This imagined network thus became synonymous with freedom of movement and democratic participation, although as we shall soon see, the material reality of networked organization is always shadowed by other more ominous modes of control. Nonetheless, these unbuilt architectural systems, prevalent in the late 1960s as models of resistance and subversion, visualized the otherwise immaterial ways in which bodies were beginning to relate to each other in the early days of electronic technologies. "It matters little that virtually nothing from all those experiments was built," argues Mark Wigley. "Or to be more precise, what was carefully built was a set of images that remain polemical today, a commentary on the networks we already inhabit rather than a dream of a future world."[26] As buildings became more permeable to their environment, even hypothetically dissolving, architectural attention turned to the evasive yet omnipresent flow of information and bodies through space—a flow that identifies the spatial landscape as network.

Postmodern deconstructivist architecture of the late 1970s and 1980s continued to explore the notion of space as event, where flexibly built sites could respond to and be activated by user movement. "Deconstruction is not demolition," the curators of the 1988 *Deconstructivist Architecture* exhibit at the New York Museum of Modern Art clarified. Instead, "deconstruction gains all its force by challenging the very values of harmony, unity, and stability, and proposing instead a different view of structure: the view that flaws are intrinsic to the structure."[27] Working in both notational form and building construction, deconstructivist architects such as Bernard Tschumi and Peter Eisenman simultaneously dematerialize the solidity of site, displace the stability of structural forms, and rematerialize the site in flux. Eisenman argues that a site, encompassing both the ground and structure, is a function of absence, containing both the memory of previous presence, by which he means both material and corporeal forms, as well as the trace of possible, immanent presence.[28] Thus the site is neither that which was there nor that which will be there, but a complex negotiation of the alternate disappearance and appearance of objects and bodies across space and in time. For Tschumi, there is no space

without event, no architecture without embodied program. In his *Manhattan Transcripts,* for example, Tschumi proposes a form of notation that refers to the idea of movement, situating the built site in a network between the past and possible movements of bodies in space.[29] According to Tschumi, bodies in motion "carve out all sorts of new and unexpected spaces," their variable direction and force determining structural form as complementary to embodied movement.[30] For deconstructivist architects, then, there are no pure, stable, or solid forms as architectural tradition would have it but, rather, a system of flows and forces occurring across time.

Now is a good moment to come back to Rafael Lozano-Hemmer since his own contemporary unveiling of the alien uses and misuses of architectural structures and sites appeals to this networked logic of flows and forces, emphasizing the participatory intervention of users, dwellers, and passersby into static buildings. For both modern experimental and postmodern deconstructivist architects, embodied and interconnected movements challenged architecture's conventions of the static place fixed by the impermeable structure, and so architecture's reenvisioned goal was to keep inhabitants in motion and thus out of place. Yet within Lozano-Hemmer's relational architecture, being and belonging in place are instead constantly reassessed and made possible through an organically self-organizing network of live and digital connections whose operation depends primarily on the participation of others across real and virtual environments. In his projects, the digital technology of the real-time interfacing guides the ways in which participants may help each other to use, reuse, revisit, and replace specific spatial sites located on the ground. Specifying the embodied encounters within a built structure, relational architecture calls attention to the uneven processes through which chosen and forced, planned and unplanned interactions take part in experiences of belonging in place.

## NETWORKED PARTICIPATION

Posing a challenge to historically utopian visions of architecture as an expansive, connective network, Lozano-Hemmer's development of Web-based inter-

faces and site-based rematerializations offers multiple avenues for participants to engage disparately, and thus not uniformly or universally, in the temporary determination of accessible public space. Such engagements occur through momentary cohesions that in turn allow some, yet never all, to use and belong within those spaces. As his relational architecture makes clear, this kind of networked participation must acknowledge residues of power and agency, accessibility and legitimacy, that ultimately decide who gets to choose to be spatially situated and who gets chosen for. Who publically participates in the drawing and redrawing of spatial boundaries, or in the self-organization of networked forces and flows, activating the potential for either grounded situation or boundary crossing? Who responds to these participatory networks? Who are the alien persons, uses, and actions that remain out of place, and how are they afforded alternative and temporary modes of individually being and collectively belonging in place? Lozano-Hemmer urges us to begin asking these questions, as he constructs the initial conditions and digital platforms for a variety of interactions among viewers, participants, and technology that together determine the ways in which we gain or lose access to spaces, as we pause in or move through them.

The digital technology that provides the initial impetus for such networked interactions is, for Lozano-Hemmer, inseparable from contemporary identity formation and modern globalized expansions into space. Many of us today cannot seem to imagine what we were like, or how we understood our world, before Web-based technologies. According to Lozano-Hemmer, the process that drives these networks is, however, "not something that has been invented or engineered, but rather that has evolved through constantly changing social, economic, physical and political forces."[31] At our present moment, it is almost impossible to be out of a network, even if some of us may be unaware of, or have no control over, our inclusion.

Invisible, omnipresent, and invasive, networks are now contemporary culture's core organizational structure, as information and new media theorists Alexander Galloway and Eugene Thacker have argued. Their jointly written book, *The Exploit: A Theory of Networks,* details the emergence of networks of

both control and resistance within the implicit relationship between political power and technology. As a distributed system, the network emerged as a corrective response to modernity's centralized power hubs and hierarchical methods of organization and control. Once various networks consolidated and engaged with each other, diffusing control ever more horizontally, Galloway and Thacker suggest, "the power centers have evolved downward, adopting the strategies and structures of the terrorists and the guerillas."[32] Widespread connectivity, while conceptually privileged, is now considered a threat by the U.S. government, and networks are even deployed as military systems in the same way as tanks and missiles.

So there is a real difference between the utopian metaphor of the network as democratically accessible and socially communal, and its specific material operations. In fact, in contemporaneously redefining network paradigms, Anthony Burke notes that "the technical liberatory image of networks has been decoupled from the reality of its opposite—that is, networks as a form of ubiquitous control. It is important then to distinguish the image of networks from the networks themselves, for as Thacker points out, 'in the discourses surrounding networks, the tropes of connectivity, collectivity, and participation obscure the material practices of networks.'"[33] Galloway has also urgently called for the material analysis of the ambivalent functions of network structure and organization, in order to understand their effects on political economy. While a network is internally structured to allow an endlessly variable multiplicity of nodes, or points of intersections, this multiplicity does not however lead inherently to egalitarian organization. "Quite the opposite," Galloway and Thacker declare, going further to claim that "the liberation of distributed networks, famously articulated by Hans Magnus Enzensberger in his writing on the emancipation of media, is a foil for the real workings of power today."[34] While humans constitute and construct networks, they do so in a way that is unequally distributed and internally inconsistent; there are rules of conduct for the horizontal relationships between computers as well as systems of vertical hierarchy that determine access to domain names.[35] In addition, while individual agency and social formations of connectivity depend

on networked interactions, networks are in fact the contemporary medium of power; they exercise control that is both anonymous and nonhuman.

Intersecting with the aims of Lozano-Hemmer's relational architecture, one of Galloway and Thacker's primary goals is to critically analyze and engage with the ways in which network technologies, as both material and immaterial, human and nonhuman, exert political power. Galloway and Thacker point to Michael Hardt and Antonio Negri's concept of empire, which, the former two theorists argue, comes closest to describing the network's operation. Like a network, an empire describes a form of global political organization that is fluid, dynamic, and ever extendable. But what happens when digital information is introduced into the mix? Here lies the significance of Galloway's theorization, and his and Thacker's revisiting, of the material and materializing operations of networked computer "protocol." The concept of protocol refers to "all the technoscientific rules and standards that govern relationships within networks. They are principles of networked inter-relationality, yet they are also principles of political organization."[36] Protocols determine, direct, control, and regulate information flow, as well as embodied and disembodied relationships in real and virtual space, and they also form lines of connections between biological forms and political systems. Indeed, protocols allow for regulation within heterogeneous contingency.[37] For Galloway and Thacker, the network's horizontal, rhizomatic, and distributed organization, as founded on protocol, signals "a new management style, a new physics of organization that is as real as pyramidal hierarchy, corporate bureaucracy, representative democracy, sovereign fiat, or any other principle of social and political control."[38] Just as distributed networks challenged centralized control, now networks themselves must be challenged. A new exploit is needed, the two authors urge—one that is asymmetrical, that is an "anti-Web," and that takes into consideration the nonhuman aspects of the network's control while also addressing the possibly nonhuman aspects of human constituency.

Outlining alternative techniques for temporarily diverting status quo power by momentarily disrupting networked operations, Lozano-Hemmer's relational architecture attempts to respond to such a challenge. On his Web

site and in a video-recorded documentation of *Vectorial Elevation,* Lozano-Hemmer calls the work an "ephemeral intervention" that reflects on "urban issues of interdependence, deterritorialization and collective representation."[39] Speaking about his influences for *Vectorial Elevation,* Lozano-Hemmer notes, "Albert Speer and Pink Floyd shows are definitely important precedents."[40] Although viewers and participants in Mexico City may not readily associate searchlights with the threatening antiaircraft surveillance and coordinated sky-scanning patterns prevalent in Europe during WWII, even Hollywood-style searchlights that celebrate over-the-top spectacles send the message that the majority of viewers are small, immaterial, and irrelevant to those producing and participating in these events. *Vectorial Elevation* proposes, in Lozano-Hemmer's words, "new creative relationships between control technologies, ominous urban landscapes, and a local and remote public."[41] Integrating viewers not only as online users but also as the central focus of the project, Lozano-Hemmer rescales the human perspective of the monolithic environment. Instead of being dwarfed by the large square, participants create images and structures that reach far beyond the already massive buildings. By granting control of the searchlights to a variety of participants across the globe, Lozano-Hemmer reveals and then replaces the link between searchlights, surveillance, and authoritarian control.

As a technology of control, the Internet was introduced in Mexico, as in most countries, for military organizational operations but still remains inaccessible to a majority of the nation. Yet for Lozano-Hemmer, technology is unavoidable—its development not necessarily exclusive to developed countries, its actualization capable of both upholding and subverting social inequality and political power. "Think of the software industry in India or the Nortec electronic music movement in Tijuana," he suggests.[42] Lozano-Hemmer's comments do not, however, pretend to erase the tension between social inequality and newly developed technology, whose control consistently and strategically remains in the hands of the already wealthy and politically powerful. Complex technologies certainly run factories in United States–Mexico border towns, but the development of that technology primarily occurs in America, and the underpaid work-

force and raw materials come from Mexico. Nonetheless, there may be hidden, microresistant opportunities within these constraints. *Vectorial Elevation,* for its part, reveals avenues through which participants can both gain and lose access to control of digital technologies, offering new spatial and social experiences that are opened up through both the production of one's own and another person's light-beam designs, and often through a confluence of the two.

With participant interactivity as key, a networked dependency emerges among environment, technology, and accidental community, as online participants and on-the-ground viewers come upon each other in a temporarily transformed real and continually transformable virtual space. Interviewing the Canadian theater director Robert Lepage in 1989, Lozano-Hemmer was struck by something Lepage said about computers: while they can communicate efficiently, the director suggested, they do not seem so good at communion.[43] Although Lozano-Hemmer does arguably make a case for alternative moments of computer-generated social communion, the differentiation between communication and communion brings to the fore a central concern of relational architecture. Not necessarily interested in providing the conditions for communication, Lozano-Hemmer's practice instead proposes multiple spaces for people to meet and engage in a shared experience that may in fact be miscommunicated, misunderstood, or unequally shared.

When speaking about his work, Lozano-Hemmer often interchanges *relationality* with *collective interactivity,* by which he means that his projects provide conditions for both "discrete individual participation" as well as "emerging collective patterns of self-organization."[44] Collective interaction need not entail abstractly formulated homogeneity. Instead, to build on arguments made in previous chapters, I am proposing that accidental, temporary, repeated, and revised gatherings, across multiple dimensions of direct and remote interactions, can form potential communities and multiple yet momentary publics over time that are elastic and constantly capable of being realigned. This kind of social coherence is heterogeneously collective and as such attempts to unveil a temporary communion of disparate, individual experiences. The networked sites and systems through which these gatherings cohere

and disintegrate offer precarious, vulnerable, and not always viably extendable moments of spatial situation. So if being in place depends on both one's and another's unequal participation in these ongoing replacements of spatial landscapes and structures, then the ways in which we come to be situated and resituated, the ways in which we possibly come to belong and to find home, are not in one or another place but, rather, within the ways we are able to make tenuous connections with others, across a variety of spaces both near and far.

## REPLACING NETWORKS OF DEPENDENCY

Acknowledging the uneven distribution of accessibility alongside the possibility of communal coherence within specific spatial landscapes, relational architecture proposes a system of belonging that is not only networked between bodies and sites but that also engages both momentary and extended dependencies between those networked bodies. It is not only that bodies connect and interact with each other, that they relate and that their relations constitute architectural experiences. I am arguing that within these spatial and social relationships we can come to see how bodies depend on one another and how the potential for belonging is opened up through these moments of dependency that are constantly being realigned and replaced. Although *dependency* has become an ideological term most recently pathologized into a morally and psychologically weak identification, the term's root "refers to a physical relationship in which one thing hangs from another," as political theorists and historians Nancy Fraser and Linda Gordon have articulated.[45] Emptied of its deviant connotations, dependency acknowledges social, economic, and political relations as necessarily uneven, interconnected, and relational. Only by considering how one experience of being and belonging in space hangs from another, how one body's spatial situation leans on another, and how those relations of hanging, leaning, cohering, and distancing are framed and repositioned, can we begin not just to propose but to viably enact a socially engaged program of replacing home.

As a way of visualizing these networks of dependency in action, I

want to end by turning to another of Lozano-Hemmer's relational architecture projects, *Under Scan*. In that work, thousands of video portraits taken across the East Midlands in England were projected onto the ground of the main squares and pedestrian passageways in Derby, Leicester, Lincoln, Northampton, and Nottingham, from November 2005 through March 2006. The project was commissioned by the East Midlands Development Agency to enliven the public spaces of those cities, and to provoke viewer interaction within the otherwise anonymous sites. Local videographers and producers spent several days in each city gathering and filming a diverse group of people who answered calls to participate in an interactive art project advertised in local papers, schools, and onlines sites. The willing participants, who included students, actors, artists, art viewers, dancers, and members of various local community organizations, were filmed from above while lying on their backs and were free to move around and express themselves however they liked. The only stipulation was that each was asked to make eye contact with the camera at least once during the filming. Their activities varied from resting in one pose, dancing, sleeping, laughing, speaking, and motioning toward the camera while appearing reserved, confrontational, welcoming, or aloof (Figure 5.5).

At first, these video portraits could not be seen under the simultaneous projection of bright white light akin to the power and color of high-noon sunlight and produced by lamps capable of generating 110,000 lumens of intensity. But as people walked around the area, their shadows gradually revealed the video portraits that began to surface as if coming up from water (Figure 5.6). This occurred as a camera-based tracking system linked up with a main computer that was tracing the direction and measured the speed of the pedestrians. The system then would point one of fourteen projectors at the locations where the passersby would most probably intercept a video portrait. The projectors were able to encompass a maximum area of 2,500 square meters, layering up to fourteen different portraits within that framework. The video portraits, in turn, were stored in custom-designed servers that could be activated by a wireless link and were capable of being corrected, rotated,

FIGURE 5.5. Rafael Lozano-Hemmer, *Under Scan*, Lincoln, U.K., 2005. Photograph by Antimodular Research.

inverted, and geometrically scaled to approximately match the size and scale of the passing bodies.[46] The short sequence of video portraits began with the subjects in a still position turned away, but as they appeared within the shadows, their bodies moved and their heads turned to look straight at the pedestrian, as if about to engage with him. When a shadow moved away from a portrait, the portrait also looked away, motionless again (Figure 5.7).

In Lozano-Hemmer's video documentation of the project, viewers became increasingly aware of the project's ability to provoke people to start talking to each other, as multiple passersby stood together in temporary

FIGURE 5.6. Rafael Lozano-Hemmer, *Under Scan*, Nottingham, U.K., 2006. Photograph by Antimodular Research.



Johung, Jennifer."Network dependencies: Rafael Lozano-Hemmer´s Relational Architecture." Replacing Home. Minneapolis: University of Minnesota Press, 2012: 131-164. Print. (english)

FIGURE 5.7. Rafael Lozano-Hemmer, *Under Scan,* Nottingham, U.K., 2006. Photograph by Antimodular Research.

groups helping each other engage with a video or watching others unfold.[47] Interrupting these interactions between viewers and video portraits was the tracking mechanism—its regular grid projected down onto the site every seven minutes (Figure 5.8). For many viewers, this particular effect was eerie, forcing them to continuously recognize that they were already implicitly placed within a surveillance system that knew what everyone was doing and could also predict what they would do next.[48] Lozano-Hemmer's relational architecture thus tracks its users, as the pathways and activities of passersby are systematically and digitally monitored. But as the tracking system is regularly revealed, his

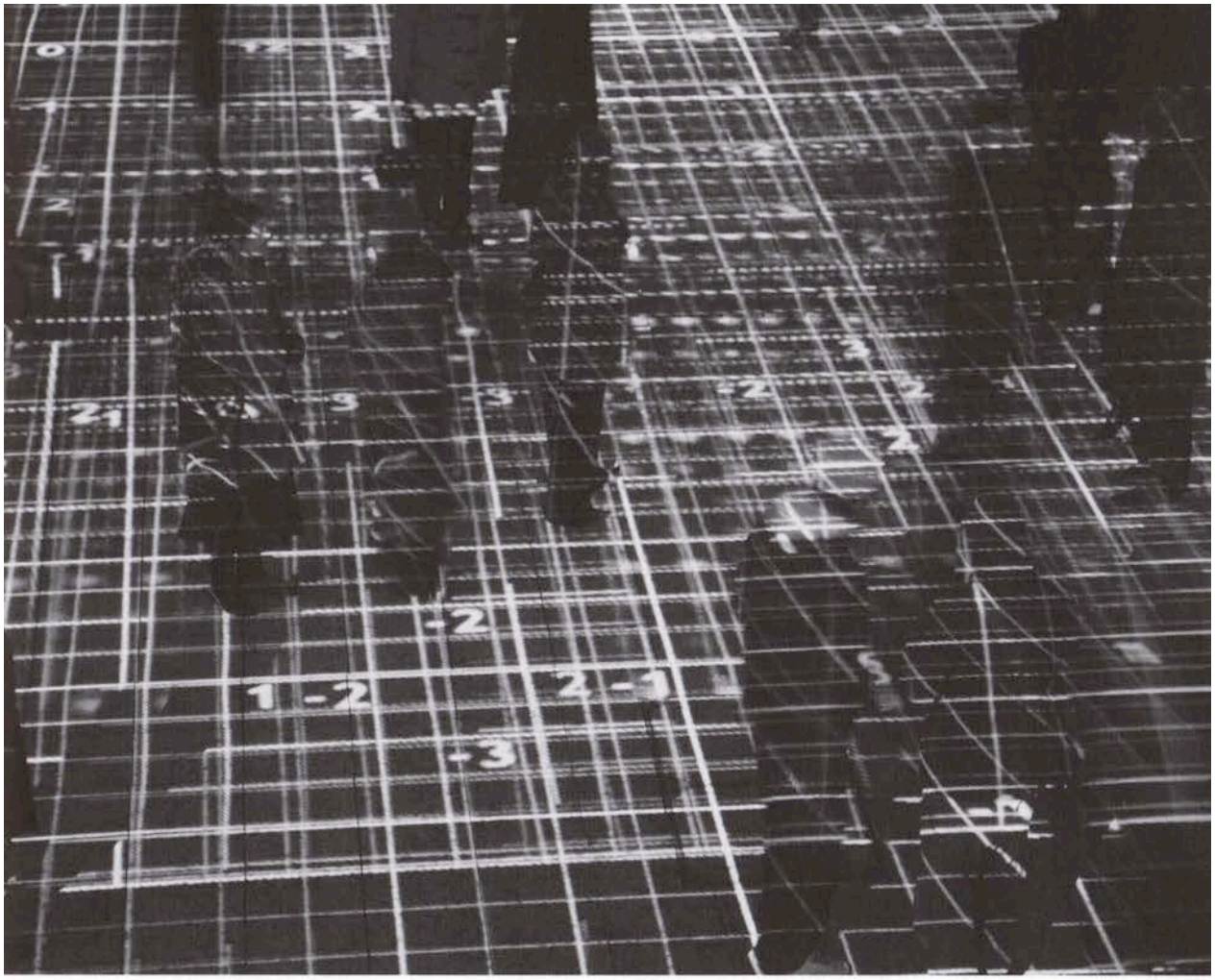


FIGURE 5.8. Rafael Lozano-Hemmer, *Under Scan,* Lincoln, U.K., 2005. Photograph by Antimodular Research.

viewers can also watch the system back, surveying the means of their own surveillance. While opening up these kinds of moments and sites of interaction, Lozano-Hemmer also reveals the ways in which participants interact not only with each other but also with the system that enables their connection in the first place. As people cross back and forth over the invisibly embedded videos, in or out of line with the tracking grid, starting and stopping at differing instances and speeds, their momentary gatherings and accidental meeting points depend on multiple recognitions across various spaces over five different cities (Figure 5.9).

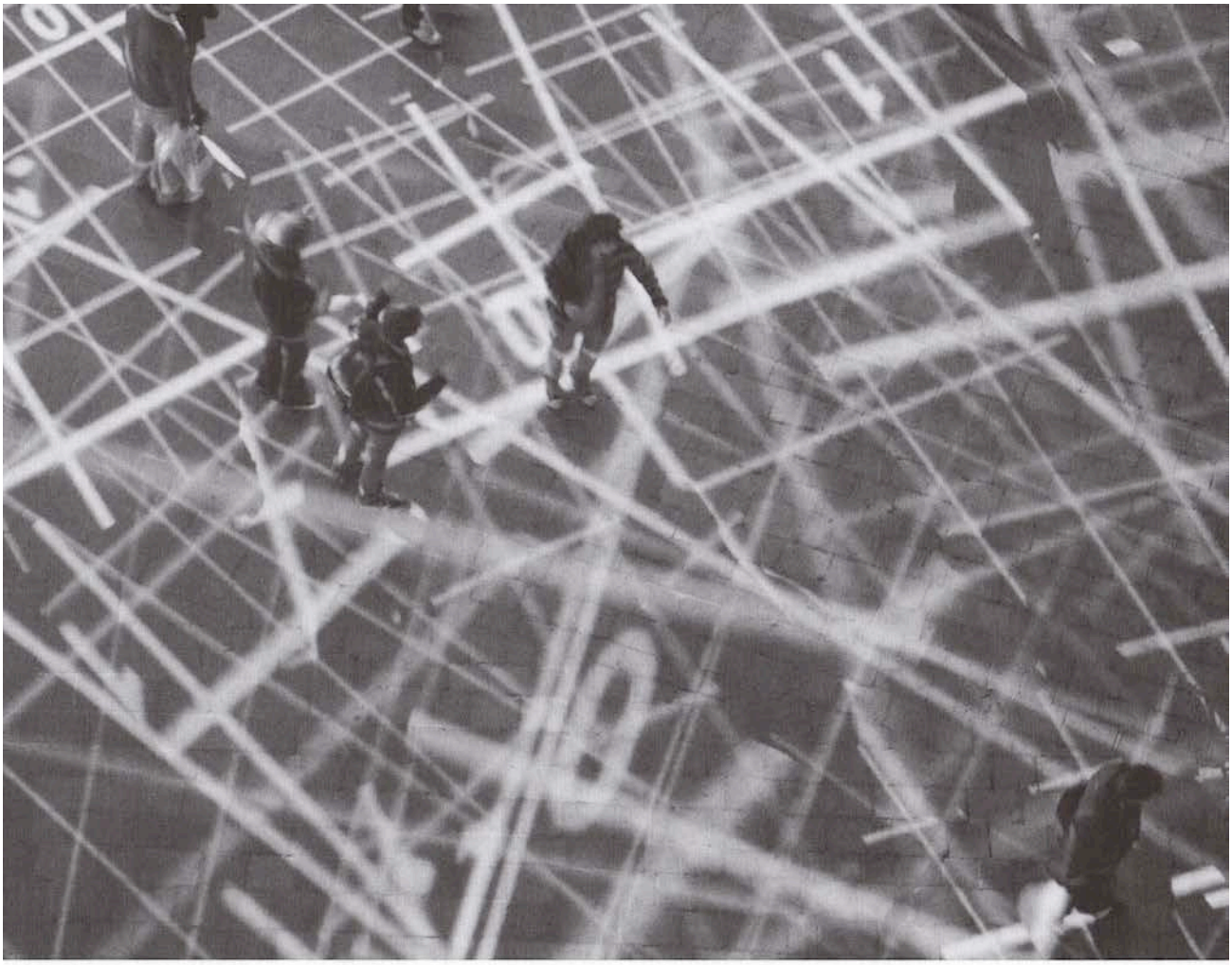

FIGURE 5.9. Rafael Lozano-Hemmer, *Under Scan,* Leicester, U.K., 2006. Photograph by Antimodular Research.

Accessibility, to spaces and to each other, can therefore be potentially revised through relational dependencies that occur in this mixed reality of real and virtual space, as one participant proposes an on-the-ground spatial experience for another or, as in the case of *Vectorial Elevation,* interacts online with the spatial configurations of past participants and creates newly possible ones. Such dependencies mutually constitute individual agency and collective organization. This mutuality is however contingent on accident, miscommunication, delay, and asymmetry as a pedestrian unexpectedly comes upon an embedded video, as another changes her path to intersect with that viewer and video in one of many unplanned gatherings, as the tracking system misfires

when someone else moves off course and that video remains unseen, or as it lays a projection down in front of another person who was not tracked but somehow fell into its line. A relational project like *Under Scan* therefore offers a visualization of how this mutual constitution occurs, as the image production of individual bodies is rendered simultaneous to the accidentally shared, unevenly distributed, multiple pathways of others as tracked with and against the larger grid pattern.

For new media theorist Mark Hansen, Lozano-Hemmer's projects "demonstrate that embodiment today can only be conceived *as collective individuation,* as an individuation that requires a certain disembodiment of embodied individuals."[49] Such a disembodiment occurs through digital technologies and networked information that nonetheless make possible the interactions that afford heterogeneously collective embodiment. In other words, disembodiment through technology in the form of information is, for Hansen, a historically necessary dimension of embodiment. Such is the foundational argument of Hansen's book *Bodies in Code,* the definition of its title, and an argument that also expounds on Galloway and Thacker's suggestion that humans are at least partially constituted through nonhuman means. *Technicity,* to use Hansen's word, and not necessarily or only networked technicity, has always been implicit in processes of embodiment.[50] When embodied agents engage with the technologies that trigger their experience of their own bodies, those of others, and the environment in which these experiences occur, Hansen argues that these interactions "establish feedback loops in which embodiment and information mutually catalyze one another's ongoing evolution, rendering it a co-evolution that perfectly expresses the contemporary stage of the technogenesis of the human."[51] Activated through Lozano-Hemmer's portrait projections, this coevolution is based on constant realignments between body and technology, and between alternately disembodied and embodied individuals and collectives.

Hansen makes his argument by focusing on an earlier Lozano-Hemmer relational architecture project, *Body Movies* of 2001, in which prerecorded, unmoving images of bodies in all scales and sizes were invisibly projected onto

the sides of large public buildings, beginning initially in Rotterdam. Viewers were able to make these images appear by matching up the shadows of their own bodies with the projections, both of which were rendered in scales ranging from human to superhuman. I have focused on Lozano-Hemmer's later work *Under Scan,* however, because it retains the human scale of both video participant and on-the-ground viewer; as Lozano-Hemmer admits, the video portraits have their own sense of agency, and so the interactions are more "bi-directional."[52] *Under Scan* also centralizes movement, as the passages of people through the square are interrupted and caught by the emerging activities of the video images. In addition, the more recent project visually publicizes the technological network of computerized tracking devices that predicts the unfolding of both planned and unplanned encounters.

These variations between the two works further qualify the processes of embodiment and collectivity as initially proposed by Hansen and, for my purposes, bring to the fore moments and sites of networked dependencies between bodies. In *Under Scan,* invisible individuals who appear very much like their potential viewers but who are disembodied through video and seemingly buried in the ground are then partially and unevenly reembodied within the accidental pathways and temporary communal gatherings of others. This process of social cohesion and individual recognition is not necessarily democratic, as the tracking devices randomly cue up video sequences while passersby, either singularly or in momentary groupings, literally have to step on another body to make its image appear under their shadows. The network of passages and pauses, appearances and disappearances can be contrasted with the regular grid and calculations of the surveillance system that validates, controls, and determines certain sites of interaction and reembodiment. Yet small systemic misfires, coincidental derailings, and variable *détournements* can also afford the possibility of other connections and social engagements as well.

*Under Scan* therefore actualizes the continuous realignments and replacements inherent in processes of embodiment and situation as directed by planned and unplanned collective forces that may be technologically, and

thus socially and politically, heterogeneous. Collective participation, which is purposively asymmetrical and necessarily accidental, is made possible by constantly changing dependencies among bodies, spatial environment, and technology. By uncovering the means by which we are linked together, these replaceable networks of interdependence continuously determine and refigure the ways in which we are conditioned by, at the mercy of, in control of, rest with, trust, and turn to each other. If, as I have been arguing across all these chapters, the process of replacing home punctuates pathways of departure and return, and cycles of use and reuse, with acts and structures of embodied lingering, then we must recognize and situate these tenuous dependencies—dependencies that form between those bodies held coincidentally, but also meaningfully, in place and that approach the experience of being and belonging at home.

For his part, Lozano-Hemmer has suggested that being in place could very well identify a feeling of knowing "that you belong nowhere and that you belong to many places at the same time."[53] To restate a version of this sentiment that has traced its way throughout this book: we may not stand still for very long, but we can continuously move into and out of place; we can resituate and replace our experience of belonging at home in a variety of sites. Resituation by way of replacement is a key process that defines our present mode of momentarily grounding ourselves in space and with others. As a model of being and possibly belonging at home, replacing activates how we come to situate our bodies in relation to one another, and in relation to our dwelling places over time.

We linger in spaces, and then we choose or are forced to move on. But in order to linger somewhere, to be at home for however long, we must incompletely, partially, or virtually replace the ways in which we were just situated, ways that depend on our coming-together over all kinds of distances. If we can attach a politics to these acts of replacing, then we are able to redo these moments of connection—to reuse and remake the sites and structures around us by engaging again with the material residues of past acts undertaken by others, onto and by means of other things. Perhaps then we may acknowledge

not only that what we do has a specific and sustained impact on the balance of things and beings around us but also that our impact is never final, that we have the ability to replace our actions, to act again with different outcomes in revisited places and with renewed engagements, to come together and apart again, and to pose that possibility for others to take on either with or after us. We replace home when we are able to rematerialize these lines of connection between past and present sites, structures and dwellers—for ourselves, but also most carefully and consequentially for others.