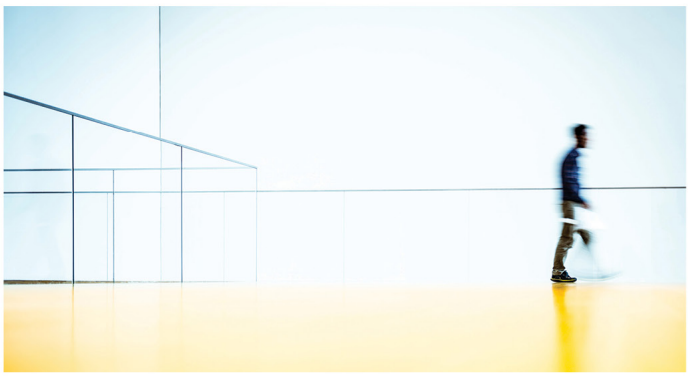
Postphenomenology and Architecture



Human Technology Relations in the Built Environment

EDITED BY

LARS BOTIN AND

INGER BERLING HYAMS

Postphenomenology and Architecture

Postphenomenology and the Philosophy of Technology

Series Editors: Robert Rosenberger, Peter-Paul Verbeek, Don Ihde

As technologies continue to advance, they correspondingly continue to make fundamental changes to our lives. Technological changes have effects on everything from our understandings of ethics, politics, and communication, to gender, science, and selfhood. Philosophical reflection on technology can help draw out and analyze the nature of these changes, and help us to understand both the broad patterns of technological effects and the concrete details. The purpose of this series is to provide a publication outlet for the field of philosophy of technology in general, and the school of thought called "postphenomenology" in particular. The field of philosophy of technology applies insights from the history of philosophy to current issues in technology and reflects on how technological developments change our understanding of philosophical issues. Postphenomenology is the name of an emerging research perspective used by a growing international and interdisciplinary group of scholars. This perspective utilizes insights from the philosophical tradition of phenomenology to analyze human relationships with technologies, and it also integrates philosophical commitments of the American pragmatist tradition of thought.

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Chapter 1

Postphenomenology and Architecture

Architecture as Measurer for Humans and the World

Lars Botin and Inger Berling Hyams

Postphenomenology is a recent branch of philosophy that is based on phenomenology, pragmatism, and hermeneutics and investigates how technologies mediate the human–world relation. Until now the focus within postphenomenology has been on how humans and technology are mediated on a micro-level, that is, how individuals and tools are intertwined and entangled with each other. In our perspective, this intertwinement and entanglement is transferred into a macro-perspective, where architecture and architectural assemblages, like for instance cities, are viewed as technology in a classical phenomenological sense. This means that we ask the same questions about architecture as we would of any given technology, might that be hammers or cell phones.

Long before the popular quote attributed to McLuhan about the coconstitutional abilities of tools, Winston Churchill, responding to the building of the House of Commons, said: "We shape our buildings and afterwards our buildings shape us."[1] Architecture mediates reality in a fundamental way, even on the drawing board and as a computer model it coconstructs a reality that is yet to be. Architecture mediates thinking through a material, and as Don Ihde has pointed to, it is a designer fallacy to believe that there is something like a perfect plasticity of that material (Ihde 2008, 58). Rather the material constructs as well. But how does this cocreation take place through and with materials? How does architecture materialize thinking? How does material become architecture? And how do different architectural technologies mediate thinking?

Architecture is not just a mediating technology in its making, but in its framing of human life. Architecture could be said to work mostly in the

background, as features on the backdrop of our field of vision (most of the time). As such, architecture might be the background relation (cf. Ihde 1990) par excellence, and this could lead to questions around how important background relations are in mediating experience. In the following, we shall address what we think is central in order to understand why postphenomenology is 'more phenomenology' as Ihde phrased it in *Experimental Phenomenology* (1986). The focus of measure and making measurements in Western science was one of the main critique points of both Maurice Merleau-Ponty and Martin Heidegger and has led to a phenomenological focus on how to understand space and place in a way that transcends mere measurements of quantitative character.

HUMAN MEASURES

In the autumn of 1958, a group of students at Massachusetts Institute of Technology (MIT), all members of the Lambda Chi Alpha society, decided to test their motto of "service, sacrifice, and even suffering and humiliation before the world, bravely endured if needed" (Tavenor 2007, xi) through the measuring of the Harvard Bridge. They decided to use a freshman for this endeavor, and Oliver R. Smoot, a 5 feet and 7 inches tall man, was selected because he was the smallest. Eventually the bridge was measured with the actual body of O. R. Smoot and the total length of the bridge came to 364.4 Smoots, plus/minus an ear (Tavenor 2007, xiv). O. R. Smoot suffered considerably during the actual measurement, to the point that he actually collapsed at the Cambridge end of the Harvard Bridge. Ironically, as Robert Tavenor reports in his book on measures and measurements, Smoot much later became president of the International Organization of Standardization in 2003–2005: "an international body intended 'to facilitate the international coordination and unification of industrial standards' using the metric system" (Tavenor 2007, xv).

The Harvard Bridge is arranged according to Smoot, that is, slabs for the pavement sidewalk measures 5 feet and 7 inches, and not 6 feet which is regular size. There are regular Smoot markers on the bridge, which the police use for their everyday work, and so forth (Tavenor 2007, xv). Smoot was not chosen as standard of the ideal man, like for instance the Vitruvian Man by Leonardo da Vinci, or Le Corbusier's 'Modulor,' but rather as representation of suffering and humiliation. Remember that Smoot was chosen because he was the shortest among freshmen. The length of the bridge is today counted in Smoots and not in feet or meters, which indicates how 'meaningful measurement' through other devices and with different rods can tell a different story than the one told by 'neutral,' universal, and calculative measurement. Heidegger pointed at this fact when he stated that:

> A strange measure [. . .] certainly not a palpable stick or rod but in truth simpler to handle than they, provided our hands do not abruptly grasp but are guided by gestures befitting the measure here to be taken. This is done by a taking which at no time clutches the standard but rather takes it in a concentrated perception, a gathered taking-in that remains a listening. (Heidegger 1971, 223)

Heidegger, as well as his students Hans-Georg Gadamer and Hannah Arendt, were convinced that calculation and measurement would inevitably lead to calculative and instrumental results, whereas a careful and mindful perception of space and time would create much more meaningful and cherishing results.

The Lambda Chi Alpha society's creed in 'service, sacrifice, humiliation and suffering' was installed and layered in the measurement of the bridge as qualities that connect the bridge as a concrete thing to the values and codes of (bewildered) young men at MIT.

In another example of human measurers, the Danish architect and designer Kaare Klint was commissioned to renovate the historical hospital in the center of Copenhagen back in the 1950s, and he was confused by the fact that when he measured, the numbers were uneven and did not follow classical proportional schemes. It was only as he got hold of some of the old drawings that he figured out that everything in the wards and indeed the wards themselves were arranged and calculated according to the length of the beds (6 feet), and thus the structure and the order showed. Before that finding, everything seemed chaotic and beyond logics, but the 'obvious' structuring made by Nicolai Eigtved and Lauritz de Thurah in the middle of the eighteenth century according to the bed size was an eye-opener for Kaare Klint in his own designs. The body of the human emerge as measurer of space and place, because space and place is in the end the measure of humanity (Botin 2015).

Architecture needs calculative measures in order to be built. Carpenters, builders, bricklayers, and other craftsmen cannot build according to the drawings of architects unless there are precise and clear indications of scale and measure. Nevertheless, different types and kinds of measures are needed for the 'living' and experiencing body to become. Michel Foucault wrote about how two distinguished 'registers' had their origins in the middle of the seventeenth century, namely, the anatomico-metaphysical and the technico-political—the former dealing with the submission of the body and the latter with function and explanation. Foucault writes:

> And yet there are points of overlap from one to the other. La Mettrie's *L'Homme-machine* is both a materialist reduction of the soul and a general theory of *dressage* at the centre of which reigns the notion of 'docility', which joins the analysable body to the manipulable body. A body is docile that it may be subjected, used, transformed and improved. (Foucault 1979, 131)

Architecture made according to the standards of calculative measures will accordingly control and master our docile bodies and open them for interventions in relation to conduct, behavior, manipulation, and transformation.

THE VITRUVIAN MAN AND THE FUNCTIONALIZATION OF SPACE

The Vitruvian man as popularly portrayed by Leonardo da Vinci centers man in the geometry of a circle and a rectangle—man is measured and used as measurer for geometry. Vitruvius writes, that because numbers are derived from human bodies—the word digit derives from the Latin digitus, which means finger or toe—then these divinely given proportions should also compose the temples for the immortal gods (Vitruvius 3.1 §9 in Isager 2017). The description of man as measurer and perfect geometry stems from the third book in Vitruvius's *De Architectura*, one of the earliest known treatises on architecture. The third book is about the temple and it is seemingly not coincidental that Vitruvius in relation to the divine takes up the discussion on proportion as the origin of form. Vitruvius seeks in man the justification for forms in architecture worthy of the divinities albeit in a geometrical standardizing manner. But the connection between the human and the spiritual through architecture remains clear.

Martin Heidegger in the widely read essay "Building, Dwelling, Thinking" writes of the fourfold or the oneness of earth, sky, the divinities, and the mortals (Heidegger 1951). It is exactly in the fourfold that man dwells, according to Heidegger. We embody time and space through temporal *place-making* that we tend to call home. According to a classic phenomenological reading, we only feel at home-in-the-world if this process has taken place. The process is endless (from cradle to grave) as Heidegger has suggested (Heidegger 1951). Every kind of architecture becomes architecture, exactly because this type of thinking has been made. If not, it is just a building and hence some sort of obsolete technology. This transcends the classical definition of architecture as the 'work' of a genius and the materialization of a brilliant thought, and focus on the processes of mediation between matter and nonmatter. Between humans and nonhumans; mind and flesh; thought and things. In this perspective, we ask the question, inspired by Heidegger: How can we embrace the chiasm of *Thinking Things and Thinging Thoughts?* Is there really a difference between building and architecture? Can a humble building become architecture to some?

Today in architecture, we have perhaps given up on the strict geometrical understanding of how man gives rise to form, that the Vitruvian man symbolizes, but we should not stop asking how human and architecture are coconstitutive. How human is a measurer for architecture and architecture a measurer for the human. Yet both in architectural theory and in present-day building

practices, there is in the words of architectural theorist Alberto Pérez-Gómez a "misconception that man inhabits not qualitative places, but a homogeneous and universal geometrical space" (Pérez-Gómez 1988, 308), as he sees exemplified in modernist architecture's focus on the grid. Therefore, one must ask how the differences between concrete place and abstract space are enacted through architecture? Otherwise we end up with a functionalization of architectural theory and a reduction of technology to technical solutions.

> The functionalization of architectural theory implies its transformation into a set of operational rules, into a tool of an exclusively technological character. Its main concern becomes how to build in an efficient and economical manner, while avoiding questions related to why one builds and whether such activity is justified in the existential context. (Pérez-Gómez 1988, 4)

The phenomenological approaches of architectural theorists such as Pérez-Gómez and similarly Juhani Pallasmaa (Pallasmaa, 2009, 2011) are typically critical of technology, and view technology as a fundamental estrangement of man from the world. Gómez writes:

> Technology has become a dominating force in the last two centuries, one that has radically determined both thought and action. Its purpose is to subjugate external reality to interests of efficiency, thereby postponing indefinitely the human need for reconciliation (Pérez-Gómez 1988, 327).

Humans and our world however remain entangled in technology, of which architecture is an instance. Postphenomenological philosophy focuses on exactly this entanglement and might therefore also be better suited to pragmatically, but never uncritically examine architecture as a technology.

Architecture is an ancient technology, and since the dawning of the practice, it has enveloped and framed life and human experience. Architecture is certainly ambiguous and ambivalent, and used sometimes with admirable intentions of creating environments that invoke feelings of pleasure and comfort, but it also has more sinister applications of cementing power relations and exclusion of the unwanted. Some lines of theoretical thought (Bataille 1929; Hollier 1989) have used architecture as an image for the controlled structured entity of the world to form their critiques of it. Henri Lefebvre's articulation of a social space as a mode different to, for instance, mathematical space led to his analysis of how space becomes a means of power (Lefebvre 1974/1991), but it also points to space itself being *multistable*. Architecture structures and limits but as a frame also enables activities. Through architecture places are produced, emerging out of more abstract space and the abstracted power-laden strategies of planning at a city scale

can be countered by tactics from a pedestrian, experienced-based and more place-oriented viewpoint (de Certeau 1984).

A higher focus on the human experiential dimension of architecture has in part won influence, as for instance in the planning theories of Jan Gehl, who famously focus on "life between buildings" (Gehl 1971/2011). Nonetheless, our built environments still spur controversies and are continuously criticized for underprivileging the human perspective. As Albena Yaneva has shown, there has been a tendency in architectural theory to regard architecture as a function of society, or alternatively, as a force in the production of society. Yaneva criticizes this for falling into cause and effect readings of architecture in relation to society. She encourages us to see buildings not as simply static aesthetic objects but as living flows (Yaneva 2012, 20–21) complete with builders, building technologies, procurement systems, users, clients, changing demands, and yes architects too (Yaneva 2012, 107). Yaneva calls for a more descriptive approach to architecture that asks the questions: 'How does this building work?' and 'how was it made to work?' (Yaneva 2012). Along similar lines, the pragmatist roots of postphenomenology make way for a non-totalizing and situated approach to architectural analysis. Explicitly thinking concepts like multistability into design might offer spaces and places where power is distributed or at least openly disposable. It remains a question, however, how we can assure the distribution of power *in space/place* through design that is multistable?

ABOUT THE ANTHOLOGY

Postphenomenology and *Architecture* could be seen as venturing a step further than some of the many accounts of classic phenomenology and architecture, for instance, the works of Juhani Pallasmaa, Alberto Pérez-Gómez, and the Steen Eiler Rasmussen classic *Experiencing Architecture*. This anthology, as the first comprehensive publication to cover the intersection of architecture and postphenomenology, is intended to address a wide scholarly audience both within the postphenomenology branch of Science and Technology Studies (STS) and an audience within architectural theory and practice, who may not be familiar with postphenomenology, but would find here inspiration and tools for work in a modern dense and multi-relational urban fabric. We hope that the anthology might find a very diverse readership such as students, scholars, and practitioners of architecture, design, city planning, urban anthropology, or philosophy of technology. The contributors to the anthology come from different fields, which would support diversity. We asked contributors to the anthology to reflect on technology as an impetus for their contribution, meanwhile, contributors were also encouraged to write relating to architecture, technology, and human relations in a broad perspective. The result is, we find, an intriguing plurality that not only in the specific

chapters but also between the chapters, so to speak, raise stimulating questions addressing the fields of both architecture and postphenomenology. It is not the place here to fully unfold these discussions, but rather the following is an introduction to two of them and encouragement to readers to perhaps independently pursue some of those lines. The two discussions we shall introduce here is that of *multistability* and the frame or *enframing*. Furthermore, the chapters in the anthology have been ordered by pairing up articles under five themes, although this, as should be manifest from the sections on multistability and enframing, does not indicate that there are no other relations between the articles or other themes for that matter.

Multistability

The concept of multistability was introduced by Ihde in *Technology and the Lifeworld* as a way of dismissing both technological determinism and instrumentalism. As Ihde writes "technologies may be variantly embedded; the 'same' technology in another cultural context becomes quite a 'different' technology" (Ihde 1990, 144). Multistability has since become a core concept in postphenomenological philosophy as expanded on by Ihde himself in *Husserl's Missing Technologies* (2016), *Postphenomenology and Technoscience* (2009) and *Experimental Phenomenology* (1986), but also notably by Rosenberger (see for instance Rosenberger 2014, 2016). Multistability is, as argued by both Rosenberger and Ihde, vitally important for postphenomenology's ontological position, where Husserl saw essences, Ihde remarkably finds multistability instead (Ihde 2009, 12; Rosenberger 2016, 154). Multistability in plain terms for architecture is what enables a church to be reconceived as an art gallery, a nightclub, or a navigation point. On the other hand, a regular residential building does not become an aircraft hangar or a lecture hall. That is, some but not all reinscriptions are possible—technologies have stabilities that restrict their use—closing off potential uses in Rosenberger's terminology (Rosenberger 2017). Furthermore, regular residential houses usually remain residential houses, or rather they have a dominant stability as a residential house, because despite such stability even a residential house might simultaneously be a home, a historic site, a building project, a crime scene, and so on. Multistability is an intricate notion of many different scales and forms as evidenced also in many of the chapters of this anthology. Multistability plays a dominant role in the analysis of Lanng and Borg, where the sidewalks of the city of Aalborg are opened up beyond their mundane scripted function to spaces of varied and unexpected activities. Lanng and Borg thus see the multistability of infrastructure as largely overlooked in design and planning processes but noteworthy in their place for everyday practices.

Multistability in the chapter by Rosenberger on surveillance does not just pertain to objects but is turned spatial. Rosenberger in an analysis of Sartre's

voyeur, who peeps through a keyhole, draws attention to the multistability of the hallway (where the voyeur might get caught in the act) and parallels this with the hostility induced in some public spaces through many different means and logics. What Rosenberger calls the investigative pivot of his analysis is thus also highlighted as multistable and of course nonneutral. For Berling Hyams the architectural drawing is multistable, and what she calls ideational drawings or relationally analogue drawings seek the ambiguity of multistability as a creative impetus, whereas the empirical visualizations seek to limit multistability aiming to a higher degree at exactitude. In this way Berling Hyams through her model of trifurcation of intentionality argues that multistability is at the core of the conception of architecture as the foundation of what is experienced as an alterity relation to the drawing.

With Appleton multistability gets an interesting twist and becomes problematized. The multistability of bike lanes, that is their openness to other uses is in part what is creating dangerous situations for the cyclists of Atlanta. Multistability, we are reminded, is not necessarily something positive, but ambiguous. In the chapter by Appleton, they therefore argue for design practices that resists what they call exploitable multistability, while of course remaining open to legitimate alternative uses. For Juchniewicz, whose analysis centers on nonplaces, multistability enables nonplaces to be both that and simultaneously places of significance and meaning to some. This might be seen to challenge the more conventional reading of nonplaces as simply smooth and without identity. Furthermore, Juchniewicz contends, nonplaces are not multistable because they can be used in various ways, but because of the various relations they generate. It is multistability that is the base for the simultaneous workings of embodiment, hermeneutic, and alterity relations in elements of hostile architecture in a nonplace, for instance.

It should come as no surprise that multistability as showcased in the chapters of this anthology comes in multiple forms and scales. This was put concisely by Ihde, who sees the initial development of the multistability concept in *Experimental Phenomenology* explored through ambiguous drawings as more linear or of a similar kind, which he finds is not the case for other multistabilities. He writes: "multistabilities take many shapes and not all are equivalent" (Ihde 1986).

Enframing

Underlying many of the articles is a thematic of enframing. Architecture is enframing. It frames our lives in all its stages and possible settings. The Heideggerian concept of enframing is generally read as something that poses us in a certain position, where we are exposed for the technical work of technology. Heidegger's seemingly gloomy vision on how enframing will in the

end lead us where 'Only a God Can Save Us' (1976) has in many ways been decisive for how the concept has been dealt with by phenomenological thinkers on technology. The fact that Heidegger himself was less determent than could be read, and opens up for technology and the enframing to also entail the saving part, hence showing the Janus face of technology and enframing, is seldom considered. There is both danger and salvation/redemption (Heidegger 1977, 333) in the enframing as well as, in technology. In this way, the concept of enframing is multistable in itself, interdependent with practices and interpretations of lived experiences on what it means to build, dwell, work, play, enjoy, pray, or whatever practices we perform in built environments.

The dangers of building that Riis detects are similar to the "digital" or the exactness that Berling Hyams treats with regards to architectural drawing—the enframing or Gestell in the article by Botin is pointing exactly at the Janus face of the concept, emphasizing the more constructive aspects on how we actually constitute as humans together with the enframing powers of technology. Carter and Botin are of the opinion that architecture carries qualities like, for instance, authenticity and relates to Heidegger's original fourfold: earth, sky, divinities, and mortals in order for the enframing to make sense in a given context, and that we should not violate this authenticity and *Dasein* of the phenomenon. Ihde's framework is a personal account for how he, together with his son, built a hut in Vermont. The narrative enframes the intimate relationship in between nature, materials, tools, and how two generations try to make sense of things through the construction of a simple hut, that is, a search for origins and intimacy. This vision of the hut as ultimate and reductive expression of being, which Heidegger tried to convey and live through his frequent use of his hut in the Black Forest, is a well-known phenomenological and existentialist approach in architecture.

Infrastructure and politics are different kind of frameworks that Borg and Lanng, Juchniewicz, Rosenberger, and Appleton address in their chapters, and both can certainly be considered as enframing in the gloomier Heideggerian sense. This is although not the case, for in relation to infrastructure we can, and should produce advice, and advocate for pragmatic inscriptions and practices. Furthermore in the political sense and perspective there are possibilities for escaping the enframement in a Habermasian spirit, which could be coined as the 'unholy alliance' between science, technology and capitalism, that is, the dominant Western political system.

Infrastructure

Both the chapters of Ditte Bendix Lanng and Søren Risdal Borg and that of Appleton involve empirical studies investigating infrastructural elements, albeit of a different character. Lanng and Borg in the chapter "Multistable

Infrastructure: The Scripted and Unscripted Performance of a Functionalist Pathway" have studied a pathway in Aalborg, Denmark, and find that "infrastructure [. . .] inevitably participates in shared, contingent conditions that cannot and should not be precisely predicted" (Lanng and Borg 2021, 20). The article positions architecture in the field of postphenomenology drawing mainly on Leatherbarrow, Yaneva, and Fallan, but also draws on Actor Network Theory (ANT) and positions this in relation to postphenomenological philosophy. Similarly Appleton's analysis in the article "Exploitable Multistability: The View from the Bike Lane" is based on Variational Cross-Examination (VCE)—a method first proposed by Rosenberger (2014), where postphenomenology is extended with the strengths of ANT. Appleton suggests complementing VCE with standpoint epistemology and provides a first-person study of Atlanta bike lanes. Their suggested method is comprised of four steps that should be widely applicable to urban spatial analysis: "1) find a case where a multistable technology's agenda is designed for aiding an marginalized actor group but is overridden by the dominant, 2) describe the larger lived relations for the technology's different actor groups implicated in the case, 3) interrogate how and why the technology's multistable use by the dominant is attained and maintained, being sure to still cross-examine the first-person marginalized perspective with the third person dominant perspective, and ultimately 4) work towards finding contextualized solutions for making the technology's design more functional by preventing its multistability from being exploited" (Appleton 2021, 51–52). On the background of this new method Appleton asks just how strong the material agency of the bike lane should be (Appleton 2021, 62) to keep "it resistant to exploitation but open to legitimate alternative uses?" (Appleton 2021, 65). For Lanng and Borg the purpose is to unfold the multistability of pathways, thereby opening the reading of them as something more than just neutral and purely functionalist. However, despite the functionalist script of the pathways they find some openness, when the actual human practices are studied. "The functionalist script does not persuade local travellers to only play the roles proposed for or imposed upon them. Instead, our analysis of the multistability of the pathway suggests that the pathway script—in its urban and social embeddedness—proposes room for people to *not* subscribe to the script. As it turns out, the pathway's material tailoring affords many other relationships with and among people, beyond simply transport" (Lanng and Borg 2021, 38).

Exclusion

Both Juchniewicz and Rosenberger address a realm of politics and power in their chapters. Architecture is viewed not just as a facilitator for human activity, but also a means of exclusion. Rosenberger sees the task of a

phenomenology of architecture to do the "work of undoing the automatic and habitual relationships we have to spaces, and revealing elements that are present but less reflected upon" (Rosenberger 2021, 99). Whereas Rosenberger elsewhere has worked with more physical exclusion (see, for instance, Rosenberger 2017) in the article "Sartre's Keyhole and the Politics of Multistable Space" he addresses mainly the exclusion that may come from the social disciplining effect of "others" either physically there or potentially there through the lens of security cameras. The security camera works a *hostile logic of self-coercion*, reminding a targeted population of rules and norms and making its target aware of themselves (Rosenberger 2021, 94). These reflections bring about not only what pertains to the particularities of surveillance technology. Moreover, they reveal the more general point of the crucial importance that how we are seen by others play in human–technology relations: "Our arrangements with our immediate devices and surrounding architecture, and how they mediate our experience, is determined in part by our place under the view of other people and the technologies through which they perceive us" (Rosenberger 2021, 83).

Juchniewicz in "Nonplaces in the Postphenomenological Perspective: The Intersection of Disembodiment, Nonalterity, and the Hermeneutics of Exclusion" combines classic readings of the city with postphenomenological theory, and demonstrates how a postphenomenological analysis can help shed new light on *nonplaces*. That is places of transit or in-between spaces like bus stops, airports, parks, bridges, roads, streets, or benches. Through the postphenomenological framework for analysis she finds that not only are nonplaces not as open as we might usually think (Juchniewicz 2021, 115) but also that they exhibit the intersection of what she names disembodiment, nonalterity, and the hermeneutics of exclusion as a twist on the classic postphenomenological relations of embodiment, hermeneutics, and alterity. The analysis leads to that multistability is established and constituted in the relations and not in the usage of nonplaces. She writes: "Artifacts in non-places are multistable not because they can be used in a variety of ways (which is usually prohibited or not accepted) as it is understood in postphenomenological analysis—*they are multistable because of the relations* they generate. Contact with the hostile bench is disembodiment, non-alterity and exclusion at the same time, and only through the postphenomenological perspective is it possible to see all these aspects of the human-technology interaction" (Juchniewicz 2021, 118).

Digital

Adrian Carter and Lars Botin as well as Inger Berling Hyams discuss the digital. For Carter and Botin in the article "Sydney Opera House: The Poiesis of Tectonic Architecture in the Age of Digital Augmentation," the Sydney Opera

House is the pivot in an analysis that as a point of departure has the inspirations for and the origins of the famous building. Berling Hyams in the article "Alterity, Digital, and Analogue—Technological Mediation in Architectural Drawing" discusses architectural drawing technology and advocates an expanded notion of architecture that also takes architectural drawing—that is architecture in the making under critical consideration: "Architecture must be considered a much broader concept than simply the built environment, particularly as quite a few architectural projects are never actually built, but still enter the field of architectural discourse as drawings. From a political point of view once a building is built, it is often too late. The architectural controversy and debate often happen through drawing" (Berling Hyams 2021, 125). The two chapters share an interest in the emergence of architecture and architectural intentionality. For Carter and Botin their analysis point toward the deep sedimentation of embodied experiences from Utzon's youth as a boat builder to the upstanding hulls of the Sydney Opera House: "Utzon's range of sources of inspiration and influences, the archē of his architecture, derived from a broad transcultural architectural thinking, that went beyond the earlier conventional western canon, but also owed much to his background, which was steeped in a craft tradition of wooden boat building" (Carter and Botin 2021, 157). Berling Hyams, on the other hand, has found that intentionality is split in three distinguishable types of relations, embodiment, hermeneutic, and alterity. Alterity relations with the architectural drawing in her reading become crucial for rigorous design work: "Rigor in design practice does not come from the disinterested objectivity, because the architect is invested in attempting to make things work, it comes rather from a listening capacity, or attentiveness to what the material says. Following Schön, the alterity relations to the drawing are vital to work rigorously" (Berling Hyams 2021, 141). Thus, a technology-centered analysis is demonstrated to be useful for understanding design practices.

Both chapters are critical of the digital, but whereas Carter and Botin turn the critique of the digital through the case of digital facades and projections on the Sydney Opera House to a problem of authenticity, for Berling Hyams the digital becomes a relational notion, rather than a technologically defined one. Carter and Botin conclude the argument with a forewarning that "if our built environment is to become an ever more synthetic, technologically augmented experience, we will become increasingly distanced from the natural environment, we need to maintain, also for our own existential well-being" (Carter and Botin 2021, 164).

Things

The concept of the thing has gained evermore prominence during the past decades within philosophy of technology and in STS. Things are considered,

in these approaches, as enmeshment of human and nonhuman elements that together make what can be coined as a sociotechnical configuration (Feenberg 2017). Things are not just external objects belonging to a world of exactly externalities, but rather what makes up the world.

For Botin and Michelsen, respectively, things are central to the inquiry. Architecture is considered as a thing, being this sociotechnical configuration of enmeshment and entanglement. Botin in the chapter "*Thinking Things and Thinging Thoughts*: Architecture and Building in Postphenomenological Perspective" uses the case of architecture to make a critique of postphenomenological theory's dismissal of Heidegger's contributions to our understanding of technology. Botin's errand is overly to reinstall the Heideggerian thing concept as elementary in any discussion on sociotechnical configurations. Botin's reading of Heidegger in this perspective is eclectic, and willingly he excludes some of the most dystopian and pessimistic lines of thought that are present in Heidegger's later essays. He also uses the semantic chiasm of "Thinking Things and Thinging Thoughts" to show how things are truly intertwined and inseparable, and that architecture is unthinkable without reflective thinking and vice versa, thinking is the product of how things are in a world, that is, how architecture and cities perform.

Michelsen takes an outset in the Marxian concept of 'reification' and examines through Critical Theory how "reification had moved from a matter of fact to matter of system—from artifacts coming out of factories to an "administered world" (Michelsen 2021, 174). This move from microscale to macroscale was also identified by Martin Heidegger in the interview in the German magazine *Der Spiegel* as he identified this phenomenon as 'planetary technicity' (Heidegger 1966/1976). Michelsen does not move within the postphenomenological framework, but many of his sources and inspirations for identifying the 'making of things' have clear affinities and overlaps with central concepts in postphenomenology. He draws on the theories from the cybernetic sociologist Abraham Moles' 'forgotten book *Théorie des objets* (1972)': "In Moles's perspective the object stands forward in a double manner of physical environment and phenomenological sphere assuming status of 'universal mediator;' a 'constructor of the everyday environment' emerging with the 'the anonymity of the industrial fabrication' effectively pervading everything" (Michelsen 2021, 177). Technology as the universal mediator and constructor of everyday environment sounds very familiar in a phenomenological and postphenomenological frame. What Michelsen really aims at is to formulate a new systems theory that addresses both the fairly gloomy discursive power approaches of Marxism and Critical Theory as well as the 'speculative realism' of Object-Oriented Ontology (OOO). Things and humans are in this perspective the products of the workings of a universal

systemic 'machine' which has been inscribed with a quest for a "design of emergence for the anthropo-eccene" (Michelsen 2021, 186).

Building

In the article "Building Dwelling and the End of Thinking" Søren Riis sets up an investigation into Heidegger's essay "Building, Dwelling, Thinking." This happens with a particular emphasis on the ambiguity of the concept of dwelling which Riis believes heretofore has received too little attention in the research literature. The analysis of dwelling is only ever more needed because of its common character, as Riis argues: "The most habitual, *das Gewöhnlichste*, concerning human beings should remain the most questionable. The most habitual fundamentally shapes us, but without we really notice it" (Riis 2021, 219). Living as dwelling, following Riis's argumentation, has become increasingly prevalent with the technologies of SmartHomes promising their dwellers trouble-free, smooth but also progressively thinking-free living experiences. Riis cautions that this development might shield the dweller not just from harm but also the intense experience of more authentic life: "While the dwelling person does everything to be protected and to live in safety, the existing human being welcomes uncertainty as opportunity. She risks life by exposing himself to the unknown and unprotected, but gains her life back as more intense, invigorating and conscientious" (Riis 2021, 225).

Don Ihde in the chapter "Heidegger, Bachelard, Building" reflects on architecture through personal experiences of building a home. The rather simple saltbox house is in no way a trouble-free experience, with beams, boards, logs, and stones heaved up in place by human endeavor (and a few simple machines) nor is the amateur architecture experience thinking-free. Even details of dimensioning and materials are so etched into Ihde's mind that they pour onto the pages of the story of the house built more than forty years ago. At first, Ihde describes how he considered Swiss style cottages "until I started to read Gaston Bachelard's *Poetics of Space* (English, Orion Press, 1964), which described an emotional aura associated with basements to attics and but imaginatively suggesting how a house should feel, and what kinds of rooms it should have [. . .] I began to realize that a house should also take account of the geography, weather, and locale of its location and so" (Ihde 20201, 230–231). The house more than an artificial construct is rather weaved into its site using local materials, and fitting it to traditions and location. It seems logical that an existential activity as building should be such a process of weaving, although it is far from the standard approach. Although not unfolded in Ihde's essay there is a sense of the amateur architect in us all—after all even animals build—building as closely connected to life and death, which brings about also a reflection of some of the architectural

stabilities such as pyramids, gardens, and monumental cities, which are found in many different places and cultures. However, as always Ihde's pointing to these stabilities ends not in categorical fixity, but with multistability: "Postphenomenological multistability implicitly argues for a multiple, non-privileged set of trajectories for architectural design. It is obviously multicultural in flexibility" (Ihde 2021, 239).

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In this anthology we are not deterministic in our reading of how the inevitable measurement will affect architecture as such, but rather point to how intentionalities other than submission, function, and explanation should also be included in design processes. This calls for the kind of intentionality that postphenomenology has inherited from classical phenomenology—especially Edmund Husserl and Martin Heidegger. It is a kind of intentionality, where there is a perceptual, sensorial, and bodily directedness toward the phenomenons of which we are part. We do not observe from the outside; we are an integrated part of a reality experienced from within. We move on the inside, but constantly confront and challenge the borders and boundaries of what defines being on the inside, because these boundaries are neither stable nor fixed, but dynamic and multistable in their being.

NOTE

1. October 28, 1943, Hansard, United Kingdom Parliament, Commons, House of Commons Rebuilding, Speaking: The prime minister (Mr. Churchill), HC Deb 28, volume 393, cc403-73. (Accessed 14 August 18) https://api.parliament.uk/historic-hansard/commons/1943/oct/28/house-of-commons-rebuilding

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Part I

INFRASTRUCTURE

Chapter 2

Multistable Infrastructure

The Scripted and Unscripted Performance of a Functionalist Pathway

Ditte Bendix Lanng and Søren Risdal Borg

INTRODUCTION

In this chapter, we use the postphenomenological concept of "multistability" to appreciate the scripted and unscripted performance of infrastructure and understand its paradoxical looseness. Our aim is to contribute to insight into the profound—yet mundane—variations of how people share agency with infrastructure, within and beyond the intentions of designers and decision-makers. One significant implication of this insight is that infrastructure becomes liberated from assumed technical neutrality and functionalist determined intentionality, and is instead recognized for its readiness to inevitably participate in shared unforeseeable conditions. For future infrastructure design this means that, like much architecture in general, infrastructure may be most relevant and responsible when it is responsive to unforeseen developments and inhabitation.

The chapter is structured as follows: In the next section briefly we clarify what is meant by infrastructure's performance being both scripted and unscripted, and why this holds importance. Next, we elaborate upon the ways in which our analysis builds upon research in "mobilities design," an interdisciplinary approach to learning about infrastructure as networked architecture, in terms of its relational configurations with a wide host of social, cultural, political, and affective formations. We then introduce the concept of multistability, drawing from Science, Technology and Society studies (STS), particularly postphenomenology, in order to expand our description and analysis of the pathway's scripted and unscripted performance. Subsequently, we unfold a study of the pathway, first outlining methodological considerations for an

analysis of the pathway's performance, through empirical studies of actual situations in which users confront scripts. Our analysis falls into two parts: one that concerns the script, that is, the material tailoring of the pathway, and one that moves beyond the script, which demonstrates the pathway's mundane multistability.

To conclude this chapter, we explain how this study demonstrates the paradoxical looseness of infrastructure. Here, the pathway is rendered visible and it is also particularized and deneutralized: the functionalist script does not always persuade local travellers to solely play the user roles commonly imposed on them. Instead, our analysis of the multistability of the pathway suggests that the pathway script—in its urban and social embeddedness—proposes room for people to not subscribe to the script. As it turns out, the pathway affords many other relationships with and among people beyond its intended transport mode. This multistable character may partly be indicative of shortcomings of how infrastructure works: better urban integration and resonance with humans and embodied mobilities, for example, should be demanded of infrastructure in general. However, this is not the only important learning point, the chapter argues: infrastructure, we find, inevitably participates in shared, contingent conditions that cannot and should not be precisely predicted.

Beyond Intention

Some observers have addressed the paradoxical existence of infrastructure. Learning, for example, from the volumes *Infrastructure Space* (edited by Ruby and Ruby 2017) and *Infrastructure as Architecture* (edited by Stoll and Lloyd 2010), infrastructure can be understood as paradoxical: it is ubiquitous and something that greatly impacts on our conduct and society, and yet it remains somewhat invisible and "black boxed." Adding to the paradox is the fact that infrastructure is significant for its extreme standardization and narrow programming, yet it still seems that infrastructure is often remarkably capable of accommodating many contingencies of lived lives (see Lanng 2014; Jensen and Lanng 2017; Lanng, Wind, and Jensen 2017). It is this paradoxical "looseness" of narrowly scripted infrastructure, which we seek to appreciate in this chapter through the concept of multistability.

Our concern here is to some extent familiar to architectural theory and practice. Among the scholars who address architecture's accommodations of the contingent varieties of human lives is architectural scholar David Leatherbarrow (see also Fallan 2008; Till 2009; Doucet and Cupers 2009). Leatherbarrow argues that architecture should be appreciated for its two-step performance: expression and accommodation (2009). He is concerned

about recognizing buildings for what they *do*, that is, looking beyond their objectivized status as independent technical or representational expressions. Thus, he seeks to enrich the appreciation in architectural theory and practice of architecture *in* its relationships; architecture among other objects and, most significantly, architecture among lives that are being lived in and with (and, we should add, despite of) architecture. This kind of relational architecture implies sacrificing an individual building's freestanding governance as the a priori concern.

This sacrifice could indeed be interpreted as a heavy blow to the sovereignty of not only the building but also of the architect. However, acknowledging architecture's inescapable participation in shared conditions is not only inescapable, but also fruitful, Leatherbarrow argues:

> Forces beyond the architect's control affect architecture's concrete reality, regardless of what was intended in the design. What is more, unforeseen influences also bring about the end of the building's freestanding individuality. No tears should dampen this realization, for a defeat of a work's apparent singularity often leads to a victory for the patterns of life it accommodates and represents. (Leatherbarrow 2009, 7)

In this statement, Leatherbarrow crosses swords with the "intention" of designers. He finds that intended uses, inhabitations, and experiences of architecture are only a limited part of architecture's "concrete reality," which "exists regardless of my interests or yours" (Leatherbarrow 2009, 46).

Leatherbarrow elaborates this position in his chapter on *Architecture's Scripted and Unscripted Performance* (Leatherbarrow 2009). He argues that architectural theory and practice should move away from the convention of recognizing only what it can predict, and striving to predict that increasingly detailed or exact. Such prediction is essentially old-style functionalist thinking that makes "the building into an object bound to intentionalities" (Leatherbarrow 2009, 46). Rather than yielding to this rational determinism, he encourages readers to consider architecture in terms of its performance, asking "not about the work, but about the way the work works" (Leatherbarrow 2009, 48). This conceptualization understands architecture as going beyond intentions; it recognizes it as embedded in contingencies. Architecture's performance, then, is both scripted and unscripted:

> Operations can indeed be managed, functions can, likewise, be scripted, but the events we take as important cannot be—or else what is planned is not what makes them important. (Leatherbarrow 2009, 51)

What Infrastructure Does

Infrastructure, too, inescapably participates in shared conditions. Perhaps it does so even more than many buildings, since infrastructure is often open and publicly accessible, operating as a key part of the connective tissue of city and countryside. This is the case even though the modernist programming of the city, with its standardization, division, and technical efficiency, has to a great extent sought to wrench infrastructure free of the networked formations of shared conditions and inevitable contingency of which it is a part.

Functionalist rationales and technical design differentiations, as well as specialization within the discipline, have guided the immense production of systems, spaces, and structures of traffic in the twentieth century. This "civilizing march" of modernity into the territory of infrastructure (Stalder and Daro 2017) greatly influenced architectural thought in Scandinavia. In 1968, Swedish guidelines of SCAFT (Stadsbyggnad, Chalmers, Arbetsgruppen för Trafiksäkerhet/City Building, Chalmers Technical University, Working Group for Traffic Safety) explicated traffic planning principles that could handle the increasing automobility in urban areas and facilitate traffic flow with a minimum of conflicts and disorder. Planning and design recommendations focused on easy access to community facilities, traffic segregation, and simple and uniform design (Hagson 2000). There are many vivid material manifestations of these principles in place today; this civilizing march has produced ubiquitous functionalist infrastructures all over the world. The pathway that we study below is one such example. It provides a clear route for the vulnerable mobilities of bicyclists and pedestrians, segregating them from the incongruent movements of smooth, ruled, and fast traffic of the insulated "iron cages" (Urry 2007) that use the vehicular road system. The pathway itself, like its surroundings, is kept simple, with a uniform expression that is meant to afford that the travellers remain concentrated on the traffic situation (see Hagson 2000). It consists of an asphalt surface that traverses a traffic-segregated functionalist suburb from north to south, with a fixed cross-section of bike path–median divider–footpath (see figure 2.1). In this design, the pathway seems to assume a certain singularity and neutrality as a service utility line.

In spite of the assumed singularization and neutrality of the pathway, it is a networked infrastructure that performs in multiple scripted and unscripted ways, as people share agency with it. Everyday lives are lived along and across the pathway, through transport, embodied mobilities, social encounters, recreational activities, and cultural events. This pathway is located in Denmark, in the suburban district of Aalborg East—a district that is currently undergoing a thorough urban transformation, with neighborhood renewal programs, social housing renovations, and the implementation of driverless

Figure 2.1 Photo of the uniform expression of the pathway, Astrupstien. 6 December 2017. *Source*: Photograph by the authors.

buses on the abovementioned pathway. As such, this example is not only a typology of functionalist design logics but is also representative of the massive resources that go into infrastructure maintenance and continuous redevelopment in developed countries (see Ruby and Ruby 2017).

MOBILITIES DESIGN

Our work with a relational, hybrid approach to analyzing and designing infrastructure is termed "mobilities design" (see Jensen and Lanng 2017). With mobilities design, we seek to identify and examine critical issues in the agencies of infrastructure—to move beyond technical-only transport accommodations and explicitly work to open up a space for understanding the wider host of social, cultural, political, and affective formations of which these infrastructures are part.

Mobilities design is inherently interdisciplinary. It has grown from combined perspectives from mobilities research (e.g., Urry 2007; Sheller 2011; Vannini 2012; Jensen 2013), STS-related streams of work on architecture and design (e.g., Fallan 2008; Latour and Yaneva 2008; Yaneva 2009), and the professional and disciplinary body of knowledge, methods, and commitments of urban design (e.g., Venturi, Brown, and Izenour 1977; Whyte 1980;

Jacobs and Appleyard 1987; Moudon 1992; Allen 1999; Arefi 1999; Burns and Kahn 2005; Mumford 2009; Krieger and Saunders 2009; Stoll and Lloyd 2010; Tietjen 2011; Ruby and Ruby 2017).

Mobilities design research brings forth a critique of and concern for the lack of meaningful and responsible ecological agency in infrastructure, the inequalities that infrastructure tend to coproduce or sustain, and the lack of relational aesthetic agency, such as contextual specificity and resonance with traveller's embodied mobilities.

Working from the perspective that these aspects are serious deficits of ubiquitous infrastructure, mobilities design is a research program that aims to ask questions, produce knowledge, and shape a conversational space around futures of mobilities spaces and structures.

An ANT perspective on design is an important way to understand networked infrastructures in mobilities design (see, for example, Lanng, Wind, and Jensen 2017). Sociologist Albena Yaneva researches ANT and architecture, sometimes in coauthorship with Bruno Latour. She emphasizes the importance of investigating architecture in and among its many relations to the world. She argues that architecture should not be isolated when attempting to understand it; rather, one should "seize it as a 'thick' mesh of entanglements, as a cosmology" (Yaneva 2012, 2; see also Latour and Yaneva 2008; Latour 2003). Architecture is always intertwined with a myriad of other "actors," an argument made by architect and scholar Kjetil Fallan in his review of the potential of ANT in comprehending architecture (2008). Fallan argues that ANT provides a particular vocabulary for understanding and describing what we already know: the incorporated sense of the architecture's embeddedness. The vocabulary that is used to discuss architecture's embeddedness is important, Fallan argues, as he finds there is a tendency to present an architectural work as an autonomous "objet d'art" and to magnify the architect as *the* author of the work. In addition to Fallan and Leatherbarrow, this point has also been made by architect and scholar Jeremy Till (2009), who highlights, through an ANT lens of relational materiality, the importance of understanding the embeddedness of architecture in complex networks, in which many actors—human as well as nonhuman—are indispensable in its creation, use, and conception (see also Tietjen 2011). Thus, the relationality of architecture is relevant both with regard to the production of architecture (planning, design, and construction), as Fallan stresses, and to its use and communication.

The concept of "affordance" is an entry point for attuning ourselves to how "users" are "led to share agency" with architecture, and thus defining the performance of infrastructure (see also Jensen, Lanng, and Wind 2016; Lanng, Wind, and Jensen 2017; see also Gibson 1986). Yaneva offers a vivid description of the concept of affordance through an example of how she

shares agency with architecture on her morning trajectory to the lecture hall, when choosing to use either the staircase or the elevator on her route:

> As I decide between them [the staircase or the elevator], I will not simply choose between mobility and immobility, activity and laziness, exercised control and self-control; rather, I will be led to share agency with them in a different way. Equipped with different socio-technical devices that mediate our actions, the staircase holds a "vision of the world" inscribed in its construction, a specific script: the width of the stairs, the inclination of the staircase, the affordance of the handrail, all these features of their design are important for me as I climb the staircase. (Yaneva 2009, 274–75)

In this passage, Yaneva illustrates how specific technologies (the staircase and the elevator) are coshaping her actions with herself; how these technologies play active roles in her conduct through their technological and material scripts. She uses the term "affordance" to describe this interrelationship of action between herself and architecture. Taking inspiration from environmental psychologist James J. Gibson, we learn that "[t]he affordances of the environment are what it offers the animal, what it provides or furnishes, either for good or ill" (Gibson 1986, 119).

"Affordance," therefore, helps us to examine and describe the environment (or object, technology, or infrastructure) in terms of the perceived and exploited uses that it offers. Affordance is therefore a concept that goes beyond the expression of architecture—how it looks or its intended function and script. It allows us to become attuned to the performativity of the material world: what it offers and what it does. As architecture critic Aaron Betsky noted, "affordance" may help us to "understand buildings not as objects, but as environments that afford us possibilities [and constraints, we should add!], that open and enclose, that respond and give us clues" (Betsky 2015).

In prolongation of such thoughts about architecture and affordance, the concept of affordance holds analytical value in understanding how travellers share agency with infrastructure, both within its scripted performances and beyond. For example, previously we have analyzed a mundane tunnel (Lanng 2014). We have explored it in situations when this piece of infrastructure turned out to surpass its functionalist scripts and emerged as a social environment and a "sensory fabric" (Thibaud 2011) of a shared agency. In that study, we saw how the tunnel worked as a material resource for action and embodied affect, as its specific affordances (coconstituted by its specific dimensions, materials, lights) invited, obliged, and impeded particular practices and experiences.

For our focus here, it is important to explore how the relationality, diversity, and contingency of agencies between people and architecture are shared.

While recognizing that a designed environment actually *does offer* something and that it has significance for our conduct (see also Verbeek 2005), the relational concept of affordance does not assume design to be prescriptive in the sense that it can fully determine our actions and experiences. In the words of Rob Shields, people play essential roles in "actualizing" things, while the "hardness [of the materials], their softness, their ability to maintain a shape" must not be underestimated (Farias 2010, 297).

Affordance, then, is a concept that precisely zooms in on the *doings*, or performance, of particular materialities in specific relations between humans and those materialities. In the following section, we elaborate on performance by introducing the concept of "multistability." Multistability allows us to collate, consider, and appreciate that it is a deep and inescapable characteristic of mundane infrastructure that many affordances, intended and nonintended, coexist and are actualized when travellers inhabit them.

MULTISTABILITY

The concept of multistability draws on STS perspectives from the fields of Social Construction of Technology (SCOT) and postphenomenology. When drawing upon these interrelated streams of work we can learn more about how to study the "seamless web of sociotechnology." This, in our view, as proposed above, needs to be done with an interdisciplinary perspective, accepting that neat boundaries cannot be found when studying infrastructure's embeddedness. Furthermore, it needs to forefront materiality, the very concrete realm of material infrastructure—its embeddedness and performance—that we need to learn about (see also Ihde 2003).

To further unpack the embeddedness of the pathway, we need perspectives that can grasp technologies in their seamless webs and can help to further unpack the embeddedness of the pathway: how it is a composite, heterogeneous, and physically localized infrastructure, entangled with daily lives of the district. By drawing on SCOT and postphenomenological thinking in the analysis of infrastructure the intention is twofold: to continue to build a vocabulary to describe the networked character of infrastructure and to engage methodologically with examining it. Analyzing the pathway in this way is owed to Madeline Akrich's 1992 essay, *The De-scription of Technical Objects*, and Rosenberger's methodological work on multistability (2014). In seeking to acknowledge, describe, and study "the wide variety of fates" (Akrich 1992, 208) of infrastructure, we activate the concept of multistability. Here we draw on postphenomenology, as well as relying on Rosenberger's proposal that achievements can be made from an amalgamation of ANT and postphenomenology in studying variations of what technologies do (2014).

Making Materialities and Their Performances Visible in the Seamless Web of Sociotechnology

Bijker and Law, in introducing the 1992 anthology *Shaping Technology/ Building Society*, argue that technologies are not isolated, and they are not purely technological. Rather, technologies are entangled with heterogeneous and contingent processes and actors, inferring that technologies could have been shaped, or could have developed, in different ways. In deneutralizing technologies, Bijker and Law assert that "technologies embody social, political, psychological, economic and professional commitments, skills, prejudice, possibilities, and constraints" (1992, 7), all of which they also act back upon. Thus, in a recursive interplay, technologies take part in building society. No distinction between the technical and the social is assumed; instead, vocabularies and methods for studying the "seamlessness" of sociotechnology are developed (Akrich 1992; Akrich and Latour 1992).

As an emerging branch of philosophy, postphenomenology is a composite field that investigates the ways in which technologies mediate human–world relations. Building on phenomenology's focus on the human–world relation, and paying particular attention to embodiment, it assumes the epistemology of the seamless yet heterogeneous character of sociotechnological, or human–nonhuman, networks understood from STS, SCOT, and ANT. Postphenomenology considers the notion of "technological mediation," which refers to technology not as something *in* the world, but as something operating *between* humans and the world, playing an active and mediating role, and thus transforming the meeting of the two. This mediation is not neutral, independent of context, Verbeek (2005) asserts as he pushes the question of intentionality to mediation:

> The intentionality of artefacts consists of the fact that they mediate the intentional relation between humans and the world in which each is constituted. When human beings use an object, there arises a technologically mediated intentionality, a relation between human beings and world mediated by a technological artefact. (Verbeek 2005, 116)

Technology generates possibilities and limitations, all dependent on the combined forces of the particularities of the user, the technology, and the wider network within which they are embedded.

When things work, indeed when infrastructures work, we inhabit them in a carefree manner and allow them to mediate our human–world relation in a "matter-of-factly" way (see Latour 2004). We become accustomed to infrastructure, our awareness of our relationship with it decreases; it becomes

mundane. Akrich identifies this familiarization as the "naturalization effect," which

> occurs when technical systems are completely integrated into the social fabric. It is only when the script set out by the designer is acted out—whether in conformity with the intentions of the designer or not—that an integrated network of technical objects and (human and nonhuman) actors is stabilized. (1992, 222)

Despite infrastructure being present directly under our feet, our awareness of it may have faded. Similarly, Rosenberger addresses the naturalized technology or object through the concept of "transparency," drawing on Ihde: "the level of transparency depends on a number of factors, including the user's individual level of familiarity, accustomedness, expectation, and bodily habituation with regard to the device" (Rosenberger 2014, 376). Indeed, when technologies are seamlessly and completely integrated into the social fabric of one's life, they become invisible (see also Pinch 2010). Thus, rendering infrastructure, its performance and significance, visible, is therefore the task at hand.

Before delving deeper into the concept of multistability, we present a brief definition. Multistability "refers to the idea that something can be more than one thing or have more than one stability" (K. P. Whyte 2015, 70). The term "stability" (sometimes also described as "variation") describes a singular stable relation to a technology. This term refers to

> anything perceived as having a constant pattern, from the constancy of images, to practices, to technologies, and so on. Anything that is stable comes across to us as having at least one of the following: a particular look, a particular way of acting, or a particular use. Multistability indicates that the same object can have more than one such stability without altering its composition. (K. P. Whyte 2015, 70)

We may typically embody a technology in a specific way, that is, in a singular stability, yet a technology can be used for purposes other than its dominant usage. It always has the potential to be understood in multiple ways and used for various purposes in multiple contexts.

Rosenberger (2014) provides us with a straightforward example. He uses a public bench to illustrate how a technology has more than one stability, or indeed, how it is multistable. Firstly, there is the dominant "bench-as-seat" stability, and secondly, the "bench-as-bed" stability. Another example is the ambiguous, but limited, number of ways in which a hammer can be put to use, as Ihde exemplified (Rosenberger 2014): to hammer, as a paperweight, an objet d'art, a murder weapon, a pendulum weight, or a door handle:

> The notion of multistability thus simultaneously highlights two points: (1) multiple relations to a technology are always possible, and (2) this potential is at the same time limited by the technology's materiality, i.e., the particularities if its physical composition. (Rosenberger 2014, 377)

For operationalizing the concept of multistability, K. P. Whyte (2015) argues that any study of multistability must clarify a pivot point, that is, a constant across the variations, which allows the variation to be a variation. Examples on pivot points previously given by postphenomenological scholars include an artifact or practice (the performance or operation). The specificity of the pivot point is important. For example, we cannot pivot around a general understanding of any infrastructure, but must look to the particular infrastructure's specificity, such as the width, height, elevation, urban context, and more.

Amalgamation of Perspectives in Studying Multistability

In the study of multistable infrastructure, we use the theoretical resources of ANT and postphenomenology, architecture and mobilities, as outlined above. We also draw on resources that explicitly combine ANT and postphenomenology. Our point of departure for this is Rosenberger's proposal for the method of "variational cross-examination" (2014). Building on the concept of multistability as well as the postphenomenological method of variational analysis, Rosenberger seeks a method that allows for the cross-examination of multiple stabilities of an artifact—a method that should remain nonfoundational, and is thus in tune with the philosophical commitments of both ANT and postphenomenology. He writes that the results "do not purport to reveal the essential nature of the technology. Instead, the information yielded is concerned with the relations themselves, situated and context specific, revealed through the critical comparison of those very relations" (Rosenberger 2014, 388).

Rosenberger suggests three general categories that characterize various stabilities: (1) comportments and habits, (2) role within a program, and (3) material tailoring. Regarding "comportments and habits," Rosenberger points our attention to embodiment, as well as the specific personal relations with technology in particular situations, drawing on postphenomenology: how users engage personally and bodily with the object, in sharing agency with it, for example, how we hold the handle of the hammer and swing it in particular ways. Regarding the second category, "role within a program," Rosenberger draws on ANT in considering the larger network of actors, of which the particular human–technology relation is a part. Lastly, in terms of the third

category, that of "material tailoring," Rosenberger attends to concrete material configurations of the artifact under study.

For us, this method has been inspirational in the study of the performance of infrastructure because Rosenberger's categories are operationally inclusive of the following dimensions of how an object performs: it includes an examination of an object's script, a situational study of its actual scripted and unscripted performance, all while not wrenching it free from its embeddedness in wider networks of other objects and people beyond this particular human–technology relation.

Conceptually, Rosenberger draws on both postphenomenology and ANT to build a "modified conception of symmetry" (2014, 381). While there are similarities between ANT and postphenomenology regarding the aspiration to overcome the dichotomy between subject and object (Verbeek 2005, 148), so as to consider the mutual relationships between subject and object, while taking into consideration the effects that technologies, or nonhuman actors, exercise on our world, Rosenberger and other authors have argued (Smith 2003; Verbeek 2005) that there are also differences between the two theories. These authors find that ANT does not develop the personal, embodied relation with artifacts in nearly the same depth that postphenomenology does. Instead, ANT, with its emphasis on systems of relations, could be an extension of the other, picking up where postphenomenology ends (Smith 2003), thus enabling them to supplement each other in a similar vein as Rosenberger suggests with the above method:

> What postphenomenology contributes to actor-network theory is the situated perspective, the perspective "from inside out," thanks to which part of the perceived associations and translations can be more closely analyzed in terms of experience and action, existence and meaning, readiness-to-hand and presence-at-hand. Correspondingly, actor-network theory contributes to postphenomenology a way to elucidate the networks of relations that allow entities to be present. (Verbeek 2005, 168)

In the next section, a particular pathway is analyzed in some detail in order to examine how it performs in both scripted and unscripted ways. Multiple affordances are offered by the infrastructure, whether intended or not, and in turn, multiple affordances are being actualized in stable human–pathway relations. Our analysis of the pathway illustrates a collation and juxtaposition of these variations of human–pathway relations, and ultimately characterizes the pathway as multistable. In this analysis, we draw upon the amalgamation of ANT and postphenomenology as outlined above, drawing particularly from Rosenberger's method of "variational cross-examination."

A MULTISTABLE FUNCTIONALIST PATHWAY

It began with a simple script, enacting the orderly organization of transport. But once it was out there, the pathway became inhabited.

The Script

The functionalist pathway traverses the suburban landscape of Aalborg East, from north to south. Separated from roads for vehicles and public transport, the pathway follows its own trajectory, configuring a unique route in the district, sometimes crossing paths with other routes. The pathway is set at a distance from adjacent apartment blocks and other buildings. Except for a few of these buildings, which have been redesigned since the original plan in the 1960s, the buildings are oriented away from the pathway, organized inwardly in clusters. The landscape is predominantly open and horizontal, toward both sides of the pathway, and toward the vast sky. Cropped grass lanes cover the gently rolling terrain, providing extensive distances between the pathway, the buildings, and other types of vegetation, which are the vertical elements that breach the distinct horizontal feel that a traveller may experience. Occasionally, trees, bushes, or buildings close in on the path, shifting the traveller's perspective from the open expanse and the sky toward framed vistas and a sensation of being enclosed as afforded by, for example, an avenue of trees, bodies of buildings, and underpasses beneath traffic roads, through which the traveller on the pathway must pass.

The pathway runs in a nearly straight line in this suburban landscape through the changing material context. It has a fixed cross-section: the bicycle path of asphalt to the west, the median divider of grass and dirt in the middle, and the sidewalk of concrete tiles to the east. This script of the pathway appears rolled out for the purpose of accommodating movement along a longitudinal axis. The paved surface lays flat, no speed bumps, no stopping mechanisms, offering a clear view along the space of the pathway. The exception happens to be an adjacent bench oriented toward the pathway, not scripted for movement, but for pausing.

Beyond the Script

In her quest to de-scribe technical objects, Akrich argues that methodologically we need to tune into the "incessant variation" that is to be found between the "designer's projected user and the real user, between *the world inscribed in the object* and *the world described by its displacement*" (1992, 208–9). Borrowing from Akrich's line of thinking, we now ask: What is that "incessant variation" of the pathway, between the world that was scripted

into its design and the way it actually performs? In other words, we seek to know: How do "real users" use it? How do they actualize affordances and share agency with the path?

Below we highlight a series of mobile situations, observed on the pathway (see figure 2.2). We collocate these with verbal accounts from group interviews with users of the pathway (see figure 2.3), and with analyses of the built and landscaped suburban environment. We combine this with knowledge of the local urban transformation process, and we bring in other research that examines the discourses in which the pathway is enmeshed.

This is done to indicate how, in particular situations on the path, scripts are *confronted* by users; to understand how users "subscribe," or do *not* subscribe, to its scripts (see Akrich and Latour 1992, 261). Further, we seek to attach these situations to wider networks of actors and agendas in which

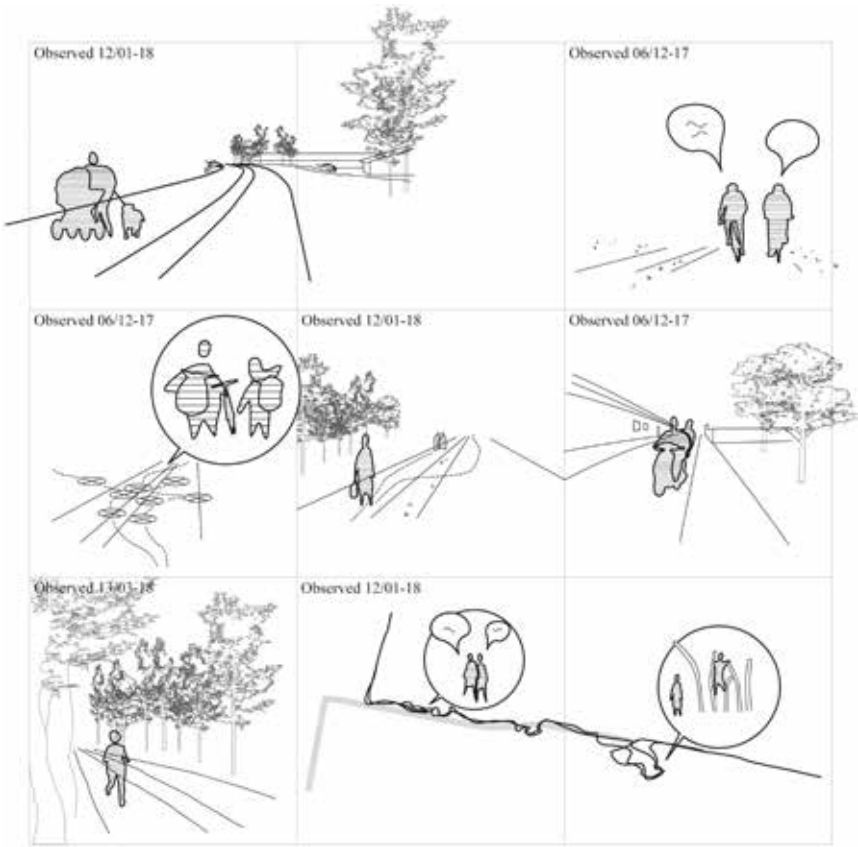

Figure 2.2 Illustrated recordings of observed mobile situations. Observed winterspring 2017–18. *Source*: Created by the authors.

The path/paths interlinks all of 9220 [the suburb].

D, f34, works in the area

Easy to get around with a wheelchair.
Many opportunities for walking, far from busy roads.

B, f36, works in the area

Children can travel safely on the paths.

D, f34, works in the area

Negative experience:
- Motorcycles driving too strong
- Insecurity due to lack of lighting

H, fxx, living in the area

Attention! in the area around (7)[a point mapped on the path] here
are many people and much activity
- We would like to keep that

D, f38, living in the area

- Has been a lot life on the path. Children + young bicyclists, playing,
welcoming, greeting.

B, f36, works in the area

Young people are hanging out in large groups - unsafe

A, m55, works in the area

Easy to be physically active,
walking - roller skating

A, m55, works in the area

There must be space for everyone, space for play, space for exercise

D, f38, living in the area

Children's carnival and events can play out on the pathway

A, m55, works in the area

Figure 2.3 Statements from focus group interviews. Conducted Spring 2018. *Source*: Created by the authors.

they are entangled. In this methodological setup, we draw on Jensen's argument to attend to "mobilities in situ" in order to better understand relational configurations of how humans perform mobilities in dynamic situations of embodied mobilities, social interactions, physical spaces, and design (2013). We also draw on Leatherbarrow's call to observe and describe the particularity of architecture at certain times, to view the way events unfold

in the present, and thus to learn about architecture's scripted and unscripted performances in the midst of inevitable contingency, asking—with him—"If we slacken the threads of intention that bind us to objects, what will appear?" (Leatherbarrow 2009, 46).

We draw on Rosenberger's category of "comportments and habits" to learn about human embodiment and specificity in the pathway's performance, as well as his category of "role within a program" to learn about the path's embedded performance in wider networks (Rosenberger 2009). The pivot point is the materiality of the pathway so as to allow an investigation of variations of how the user–pathway relationship stabilizes—variations of how infrastructure and humans share agency in different, particular, and yet mundane, ways.

Below, we group variations of stabilization of this relationship into three sections. We show the pathway's scripted and unscripted performances, as (I) a thoroughfare, not solely for transport but for embodied mobilities; as (II) an urban space for everyday life, embedded in the layout of the district and daily events of the local community; and as (III) a cultural and recreational space of identity and resistance.

Pathway Stabilities I: Transport and Embodied Mobilities

First, let us consider two observed mobile situations: a jogging woman, with pram and dog (observed January 12, 2018), and two cyclists in conversation (observed December 6, 2017; see the top row of figure 2.2). The jogging woman runs on the bicycle lane, which is wide enough to accommodate herself, the pram, and the dog. The cyclists also travel on the bicycle lane, side by side, continuously conversing. These mobile situations appear banal, and we do not know how it feels for these people to travel there, nor do we know their (tacit) reasons for sharing agency with the pathway in their chosen ways. But these situations do tell us about the scripted and unscripted performances of the pathway. In these situations, we see instances of travellers and the pathway sharing agency, stabilizing their relationship, so that in overall terms, the pathway performs as a thoroughfare. As a thoroughfare, the pathway affords mobilities of many kinds. Both situations described above are examples of how the wide cycle lane can be occupied, though in very different embodied, social, and material situations. In the first situation, the woman pushes the pram and holds onto the dog leash, as her feet, and the dog's paws, hit the asphalt. In the second, the two cyclists, on wheels along the smooth path, are speedier than the jogger but they are not going so fast that they cannot maintain a conversation, as they go along the pathway. In these situations, we argue, the travellers cannot be adequately categorized as pedestrian or cyclist, and the pathway does not conform to perform within its functionalist script of soft transport modes.

"Transport," according to Tim Ingold, is characterized "by the dissolution of the intimate bond that [. . .] couples locomotion and perception" (Ingold 2007, 78). Infrastructure often seems to assume "the transported traveller" as its user: a generic, categorized user, who must be transited from place to place (Ingold 2007; see also Cresswell 2006; Bissell 2010). Transport means "to carry across," and this seems to not involve "so much bodily movement" (Scheldeman 2011, 129). But as suggested by the two situations outlined above, richness and variation of embodiment is abundant in human–infrastructure relationships involving physical travel. This is also asserted by sociologist John Urry, who states that "physical travel involves lumpy, fragile, gendered, racialised bodies encountering other bodies, objects and the world multi-sensuously" (Urry 2007, 272).

In transport infrastructure scripts, travellers of all kinds and in multiple variations of comported, habitual, embodied relationships with the pathway tend to be reduced to manageable categories of pedestrians, cyclists, motorists, and passengers. The pathway is scripted for transport, not for the richness of actual events taking place or for contingencies and variations of transport. Thus, the pathway began with a script, enacting "hypotheses about the entities that make up the world into which the object is to be inserted" (Akrich 1992, 207–8). In spite of the rather narrow functionalist hypothesis, the pathway—as we have exemplified—performs in unscripted ways accommodating multiple variations of embodied mobilities.

Pathway Stabilities II: Everyday Lives

Let us consider a third situation. It is afternoon. Two children, each carrying a backpack and one pulling along a bicycle, drift around and along the pathway (observed December 6, 2017; see figure 2.2, second row on the left). From a distance, it seems as if they are performing a slow-moving dance as they move back and forth across the sidewalk, the median divider, the bicycle lane, and the adjacent lawn, around in circles, close to each other, and apart again. A conversation is playing out between them, as the children share agency with the pathway and its close surroundings. We guess that they come from the nearby public school, and that they are on their way home. Obviously, they are in no rush. Their journey happens slowly; they are indeed drifting. What we have witnessed here could be an event of important social togetherness, as we have found in previous studies on journeys home from school (Lanng 2015). These rather ordinary journeys home from school may, as multiple other instances of ordinary journeys, encompass personal, embodied and specific friendships, obligations, joys, difficulties, memories, and much more. These journeys seem to be accommodating the betweenness of the time–space of the pathway on certain occasions.

In the exemplified situation above, the children–pathway relationship is stabilized in such a way that the pathway performs as an urban space for their everyday lives as young children to be lived. The pathway script itself, however, does not include formal, intended affordances for drifting or social interaction, or much else that makes an (ordinary) event important (paraphrasing Leatherbarrow, as quoted above). But its embeddedness into the larger network of concrete material configurations contributes to this performance. The pathway is situated as a "spine" through the suburb, along a range of important, informal and formal, local spaces and buildings, such as playgrounds, a school, adjacent pathways, a library, a leftover pile of dirt and a puddle, and much more. With multiple and porous interfaces, the pathway is embedded into this entire suburban network of objects and people who inhabit spaces and buildings in multiple ways, interweaving the pathway as an urban space in the "comportments and habits" of their everyday lives.

Pathway Stabilities III: Identity and Resistance

Let us extract one last situation from the seamless web of the suburban pathway. A young woman is jogging, her body is situated in space as she moves swiftly through the gently rolling and well-manicured landscape architecture. She is exposed in the open space and has wide vistas and then, as she moves further, she is enclosed by the avenue of trees, while all the time being in the middle of the dynamics of seasons and weather, temperature, smells, sounds, colors, wind, and humidity (observed March 13, 2018; see figure 2.2, bottom row on the left). She shares this agency with the pathway's smooth asphalt, its long straight line over the landscape. Other situations of recreational and sport activity occur here. The pathway is a favorite roller-blading route for some. That is, when the skater–pathway relationship is not destabilized by neglected cracks in the asphalt or by rubble blown onto it from a neighboring construction site. Larger gatherings also occur along the pathway: the local community's May Festival, and the Children's Carnival, with a parade along the pathway. These events are photographed and reported annually by local media. At these different recreational and cultural occasions, there are probably more variations of human–pathway relationships than we can imagine. The situation above and other imagined ones are examples of how the pathway performs beyond its functionalist scripts and operates as a recreational and cultural site of importance to everyday life, sociality, feelings of belonging, as well as place and community identity.

The pathway is sometimes referenced into wider networks of place and community identity in our empirical material. Since Aalborg East is a district characterized by having social problems, it seems that the pathway performs not only as a "spine" in the urban layout, but also as a "spine" in larger

socioeconomic formations. Some research suggests that social problems alone cannot explain the harsh image of the district (Christensen and Jensen 2012). An issue noted in this research is territorial stigmatization that draws much of its force from the suburb's demographic composition of age, gender, and ethnicity, with related discourses of cultural racism and stereotypical criminals. Skjøtt-Larsen (2008) registers a consensus about the suburb's symbolic status as one of poverty, crime, and other social problems. This consensus, however, is challenged by local residents, who express devotion to their neighborhood and community. Several of these residents could not see themselves living anywhere else in the world, while they simultaneously express frustration at the stigmatization, the "low status" of living there, with which they are confronted by media and "outsiders." With this admittedly partial insight into the pathway's enrolment in a network of discourses, stigma, and resistance, we suggest that the pathway, with stabilizations of various rich and embodied human–pathway relationships, whether at local cultural events or for daily recreation or sociality, performs as a space of resistance and identity-building.

A Locally Naturalized Multistable Infrastructure

Juxtaposing these brief glimpses of situations along the pathway, including various "comportments and habits," as well as "roles within a program," in conjunction with the simple, uniform "material tailoring" of the pathway, we have demonstrated the pathway's scripted and unscripted performance, and examined a plurality of stabilities of the human–infrastructure relation. A dominant stability appears to be contested.

The script began as simple, bringing about an orderly organization of transport. However, once in use, the pathway was inhabited both within and beyond its scripts. Through the pathway's participation in the shared conditions of this inhabitation, that is, its complex affordances and embeddedness in richnesses and varieties of everyday life, in the built and landscaped suburban layout, and in wider networks of discourses, stigma, and resistance, we have come to a greater understanding of this piece of mundane infrastructure as being characterized by multistability. It cannot be contained as a technical utility line for transport. That is only characteristic of part of its performance. Rather, it is locally naturalized as a multistable infrastructure with multiple coexisting stabilities some of which we have demonstrated here. It performs as a thoroughfare, encompassing an incredible variation of embodied mobilities. Simultaneously, it is an urban space for everyday life with an abundance of contingency as a cultural space of resistance and identity-building.

CONCLUSION: WHY WE NEED TO APPRECIATE MULTISTABILITY IN INFRASTRUCTURE

The functionalist transport agenda appears to seek to exercise relatively strong constraints over those who make use of infrastructure and for this it is often criticized. It is a transport agenda of efficiency and command, enacted through infrastructures designed by universalist scripts of order, segregation, and separation. When travelling along certain infrastructures, the mesh of this transport agenda with its superimposed strict scripts appears to draw tightly around us. Apparently, it seeks to push travellers into specific user roles. These user roles are reducing travellers of all kinds and in all kinds of situations to the manageable designation of "transported travellers" in the categories of pedestrians, cyclists, motorists, and passengers. Not much acknowledgment of the multiple embodied, social, cultural, and economic varieties that separate travellers' circumstances from each other appears to be included in those user roles.

What we have seen, however, in the study of the pathway above is that people do not allow themselves to be pushed into these tight user roles. The functionalist script does not persuade local travellers to only play the roles proposed for or imposed upon them. Instead, our analysis of the multistability of the pathway suggests that the pathway script—in its urban and social embeddedness—proposes room for people to *not* subscribe to the script. As it turns out, the pathway's material tailoring affords many other relationships with and among people, beyond simply transport. Perhaps this is because the pathway was technically misconceived from the beginning, with too little consideration for travellers' needs and aspirations, and too little acknowledgment of infrastructure's embeddedness. This is likely at least partly true. Much better urban integration and resonance with humans who "dwell-in-motion" (Urry 2007) should be demanded of infrastructure (see also Mossop 2006). To demand this, infrastructure must be deneutralized and rendered visible. We must seek to resist the convention to bind the study of infrastructure to intended scripts, reenacting a functionalist vision of order, objectivity, neutrality, and utility. Infrastructure participates in shared conditions. Accordingly, like other technologies, it is socially shaped. Its design, existence, and development are not nature-given, neutral, or controlled by an inner logic. Hence, infrastructure could be different. Infrastructure's design in the future could take a more deliberate, more critical, more responsible, and more creative direction by seizing infrastructure as "a 'thick' mesh of entanglements" (Yaneva 2012) by working with it *in* its networked ethico-aesthetical, socioenvironmental, and technical agencies. This resonates with calls for better infrastructure design by architect Stan Allen, for example, in his contemplations of an "infrastructural urbanism" (1999), and by urban

designer and scholar Alexander D'Hooghe (2010), who argues that we must "localize" and "spatialize" infrastructure in order to move away from an understanding of "infrastructure-as-technocratic-system" and toward appreciating the ambiguities and multiplicities of infrastructure as public space and public form.

Our own work on mobilities design also examines these ideas in, for instance, exploring the imagination and democratization of future mobilities through relational and hybrid mobilities designs (Lanng and Jensen 2019). However, when setting goals for the performance of infrastructure, we must also remember Leatherbarrrow's critique: that any piece of architecture participates in shared and contingent conditions. Accordingly, our analysis and reflections in this chapter suggest an architectural appreciation and critique that is not bound to the intentionalities of architects (or other actors who shape and make decisions about the physical environments of others), but open to other processes of design, of daily use, of contestation, and of maintenance. Accordingly, when discussing infrastructure design, we must remember that infrastructure's performance is not of designers' or decision-makers' full control—not even close. It is an inescapable premise that infrastructure participates in shared and contingent conditions. These cannot be precisely predicted, nor should they be. This applies to infrastructure as well as to the wider notion of architecture, which suggests that when the (intended) singularity of an object is defeated, it seems that "a victory for the patterns of life it accommodates and represents" is possible (Leatherbarrow 2009, 7; see also this chapter's introduction). Infrastructure, like much architecture in general, may be most relevant and responsible when it is responsive to unforeseen developments and inhabitations.

One basis for such a practice of mobilities design is to strengthen and cultivate a critique of and appreciation for infrastructure that targets its paradoxical existence, its multiplicities and ambiguities: an acknowledgment of infrastructure as having a great impact on our conduct and society. It impacts everyday lives, equity, ecology even though it tends to be nearly invisible and "black boxed." Because infrastructure tends to work with an immense stability that naturalizes its performance, it is easier to recognize a critique and appreciation of infrastructure's multiplicities and ambiguities when it breaks down or when it is openly contested (see Ruby and Ruby 2018). However, it is not only relevant to examine and question infrastructure's current state under such extreme conditions, but also to examine and question ordinary infrastructure under ordinary conditions. As we have argued in this chapter by elaborating upon a vocabulary to help describe the networked and "loose" characteristics of infrastructure and to engage in its methodological examination, mundane infrastructure is also multiple and ambiguous.

In accordance with these reflections, in this chapter we have not sought to develop new instruments or methods for predicting what infrastructure should do. Instead, we have articulated an argument for an approach and appreciation of infrastructure's inevitably diverse performances, which we hope can open and contribute to responsible and responsive infrastructure design practices.

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Chapter 3

Exploitable Multistability

The View from the Bike Lane

Charley Appleton

There is a movement to make our streets more complete by retrofitting them to be multimodal capable, often by including a conventional bike lane. As is regularly the case with technological solutions to human behavior problems, unintended consequences grow. I situate my analysis in the position of seeing the striking tension between the rise of the quintessential bicycle lane built into the public transportation infrastructure and its felt reception as a manufactured conflict zone. Specifically, the designed nature of these conflict zones is seen in the reoccurring traffic safety problems that plain bike lanes introduce, such as cars turning into forward travelling cyclists ("left crosses" and "right hooks"), bicyclists being struck by a parallel parked car's door opening into a bike lane (getting "doored"), cars and mass transit vehicles crossing over the bike lane from the travel lane into a parking spot or bus stop, cars drifting into the bike lane, and cars parking in and thereby obstructing bike lanes to name the more dangerous examples (League of American Bicyclists 2014; Lusk et al. 2015). In this chapter, I include these thoughts and fears but focus upon the latter: the practice of car drivers turning defenseless bike lanes into parking spots.

Arguably one feature of all technologies is that they are multistable (Ihde 1990, 1999) and the bike lane as a public space technology is no exception. The conventional bike lane is both a separated cycling (SC) facility and a free parking spot, making it a multistable technology with a design so open that it is exploitable. In the context of the public policy agenda to make cities more multimodal, the point of having this public space technology is to establish a "background relation . . . that serve[s] to insulate humans from an external environment" (Ihde 1990, 110), meaning that here the goal of the human–world relationship as mediated by the bike lane is to insulate bicyclists from faster and heavier motor vehicle traffic. Therefore, when a bicyclist is riding

in a bike lane and encounters a parked car, they are forced to merge into the travel lane with car traffic because they have experienced a breakdown in their bike lane mediated relationship to the road. Studying this breakdown allows us to dive more deeply into the nature of this relationship.

In this chapter, I first provide an overview of the importance of city cycling in the context of the United States to motivate this study from a practical perspective. Following that, I explain the method of VCE (Rosenberger 2014) and offer a way of extending it from being the synthesis of postphenomenology with ANT to include standpoint epistemology. Third, I provide a case study of a bike commute using VCE to analyze the practice of car drivers' parking in the materially weak conventional bike lane. I close with a twofold discussion of how the conventional bike lane can be treated as a blank canvas cut from the road that can benefit from physical enhancements and how this process is aided by using the tools of inquiry that VCE provides.

WHY CITY CYCLING MATTERS IN THE UNITED STATES

In our daily lives, it can be easy to overlook how fundamental the roads and their designs are. Life seems to happen largely indoors and roads are just the things we use to get between destinations. Challenging the seemingly passive or inert nature of infrastructure, I agree with others that "infrastructure is not inert but rather infused with social meanings and reflective of larger priorities and attentions" (Howe et al. 2016, 548). Admittedly, infrastructure is larger than roads, but roads alone do represent a significant amount of space in the majority of places where we live. Cognizant of this, the UN-Habitat's *Streets as Public Space and Drivers of Urban Prosperity* report (2013) quantified the amount of space taken up by streets in fifty major cities around the world. For the core urban areas of these major cities, the land area dedicated to paved streets usually exceeded 25 percent. One intuition is that having streets take up a quarter of city space is too high and less roads would be better. Arguing otherwise, the UN report authors conclude that 30–35 percent of urban street development along with 15–20 percent greenspace is the target proportion best suited to accommodate growing populations and their livelihoods. Cities with less than 30 percent urban street development are structurally unable to avoid congestion problems and those impacts disproportionately impact people with lower income than with higher income.

If a city is facing congestion, simply building more roads is insufficient. After all, the phenomena of "induced demand" describe how highways and major roads at capacity respond to an increase in travel lanes not by alleviating traffic, but rather by absorbing the increased capacity and returning to

similar levels of congestion (see Noland and Lem 2002 for a literature review and Handy 2015 for a policy brief). Mode-shifting out of the personal car and into nonmotorized and mass transit modes is essential for overcoming congestion (U.S. Federal Highway Administration 2012; Macmillan et al. 2014). Therefore, the transportation system must be increasingly multimodal in order to effectively handle urban congestion. Recognizing that cities can and should provide and support an efficient, climate change ready, multimodal transportation network requires also recognizing how the transportation network ought to explicitly enable economic development strategies while addressing issues of equitable access (Zavestoski and Agyeman 2015; Karner et al. 2016). And cities should do this in tandem with a public health agenda that encourages higher rates of physical and mental health. This can be done with an average 5:1 benefit–cost ratio, according to the World Health Organization's aggregate study (Cavill et al. 2008). Here in the in United States, the inactivated potential of cycling is difficult to exaggerate, where 40 percent of the daily trips taken are less than 2 miles (3.2 kilometers) (Dill et al. 2013) which is a very bike rideable distance. But currently in the United States, the national average bicycle ridership rates for all trips taken have risen from a mere 0.6 percent in 1977 to 1 percent in 2009 and has since hovered (Pucher et al. 2011; League of American Bicyclists 2018).

Unsurprisingly, there is an urban/rural difference. The American urbanite is slightly more likely to use a bike for getting around than their rural counterparts, 1.1 percent compared to 0.8 percent (Pucher et al. 2011), and are twice as likely to bike commute to work at 1 percent compared to their rural bike commuters who ride at the rate of 0.4 percent (McKenzie 2014; McKenzie and Rapino 2011). Admittedly, this gap is not entirely explained as a difference in mere preference. The built environment is different in that urban areas are more likely to have bicycling facilities than rural areas, thereby making it more possible to use a bike because a bike lane is present (Sener et al. 2009). This can lead to a chicken-or-the-egg problem (which came first to the city, the bicyclists or the bike lane?) but such thinking is overcome by considering the latent demand that is activated by building bicycling facilities, which is well documented in the bicycle policy literature (Sener et al. 2009; Krizek et al. 2009; Dill and Carr 2003). The facts remain that Americans do use bicycles more in cities than in rural areas, many bicyclists want to use their bikes more, and moreover, some people move to those cities because they desire being able to use their bikes. This synergy can be seen in cities like Davis, CA, with a ridership of 15.5 percent; Boulder, CO, at 9.6 percent; and Portland, OR, at 6 percent, all of which are known for being bicycle-friendly exemplar cities (Buehler and Pucher 2012, 12).

Despite the overall low ridership rate of 1 percent, bicyclists have represented 2 percent of traffic fatalities consistently across the past decade

(NHTSA 2009; Pucher et al. 2011; Goodwin et al. 2013; League of American Bicyclists 2018). Compounding the disproportionate nature of bicyclists in ridership versus fatality is the fact that these bicyclist deaths are increasingly an urban problem, as the urban/rural split was nearly even in 1975 and is now urban dominant at 71 percent (League of American Bicyclists 2018, 195). Riding a bike understandably carries both great personal benefit and great personal risk. It seems to be a theme, as this dual feeling parallels city cycling being both essential for facing our future's challenges and yet it can appear nearly impossible to achieve. Building separated bicycle infrastructure was supposed to be the solution.

At this point we can ask: how do bicyclists relate to road infrastructure? A commonly used typology in the academic literature and increasingly in municipal bicycle planning documents is the "four types of cyclists," which breaks down people's level of comfort on a bicycle into four categories: "strong and fearless," "enthused and confident," "interested but concerned," and "no way, no how" (Dill and McNeil 2014, 2016). First, there are the "strong and fearless" who feel very comfortable on nonresidential streets regardless of whether a bike lane is present or not. When asked if they are willing to bike on roads with traffic speed of 35 mph (56 km/h) or greater, on roads spanning up to four lanes, and without SC infrastructure, they are apparently fine. One step down are the "enthused and confident" who are comfortable riding on nonresidential streets when bike lanes are present, but if separated cycling infrastructure is lacking, they will still ride. Using the most recent study which surveyed the top fifty American major cities, these two groups combine to 12 percent (Dill and McNeil 2016, 93–94). At the other end of the spectrum are those in the fourth category of "no way, no how." They are the demographic who will not ride a bike out of physical disability, health issues, or simple refusal and cover 37 percent of the national metro population. Planning should not target this group. Instead planning efforts should target the middle type of "interested but concerned" because they make up half of the American city dwellers and, importantly, *their discomfort on nonresidential roads without bike lanes prevents them from riding.* This group is the source of the latent demand most likely to be activated by building bicycle infrastructure.

This raises the question of what kind of infrastructure is necessary for activating this latent demand for city cycling. In another study by Dill and McNeil using the same typology, they report that a mere 2 percent of the target user group "interested but concerned" would feel very comfortable on a 35 mph (56 km/h) road with a bike lane (2014). The conventional bike lane is not protected enough to feel safe for this target user group. But if the facility were physically separated with protection, the figure increases to 43 percent. The overall effect is about only 1 percent of people (who are largely white, male, and young adults) are served by the absence of all separated bicycle facilities,

3 percent are served by the presence of a conventional bike lane (who are majority white, male, and young adults but are slightly more diverse), and an estimated 80 percent of the U.S. total population (with diversity across races, genders, and ages) would feel comfortable or very comfortable if the separated bicycle facility is protected. Ultimately, equitable access to a bicycling network cannot be realized until design standards shift from providing the vulnerable conventional bike lanes to a more protected form (Nelson and Allen 1997; Dill and Carr 2003), especially if the political will to lower the speed limits is lacking.[1] Overall, American city cyclists and potential cyclists face the reality that by and large, the city, state, and the federal government are complacent with providing unsafe feeling bicycle facilities as the backbone of an incomplete network. This is arguably why American bicycle ridership rates are so low; the infrastructure we've built has selected primarily the "strong and fearless" to be our 1 percent ridership rate. But we know what solutions work when we look abroad to other countries, like Denmark with its ridership rate of 18 percent and the Netherlands at 26 percent, both of which have invested heavily in protected bicycle infrastructure (Buehler and Pucher 2012). It becomes a matter of ignorance and injustice for American cities to refuse building our cities to have more complete streets with equitable access for all types of bicycle users.[2]

VCE AS A METHOD OF APPROACH

VCE is a method first proposed by Robert Rosenberger in the stimulating piece "Multistability and the Agency of Mundane Artifacts: from Speed Bumps to Subway Benches" (2014). In the paper, Rosenberger "agrees with the amalgamators" (379) that the strengths of postphenomenology are complementary to and extended by the strengths of ANT. Where postphenomenology is most capable in understanding how the lived experience is mediated by technologies, ANT carries these relations to the next level of the sociological by focusing upon how humans and nonhumans act together and against each other in larger social patterns. In a footnote of Rosenberger's paper, he mentions the fruitful possibilities of further extending and refining the method by including feminist epistemology, specifically standpoint epistemology.[3] This would aid in explaining how to better account for the situated perspectives held by the various actor groups and their experiences as shaped by power. In what follows, I summarize Rosenberger's approach and then, taking this lead, I offer one way of fulfilling Rosenberger's intention of extending the VCE method. In this way, I am able to analyze how a road repainted to include a bike lane creates a sociotechnologically loaded space with particular, distinct, and frequently overlooked meanings for both the marginalized group (i.e., bicyclists) and the dominant groups (i.e., the various car driver groups).

Rosenberger's postphenomenology and ANT combination follows essentially a two-step approach of first exploring the multiple ways a technology *can* be used and second seeing *which* use is dominant and *why*. To unpack this, the concepts of multistability and technological agency are fundamental. Multistability has grown to be one of the more central areas of conceptual development in postphenomenology (Ihde 1990, 1999; Rosenberger and Verbeek 2015; Whyte 2015; Rosenberger 2014, 2017). Essentially, multistability is the concept that we as humans have a habit of finding new and alternative uses for things that were often not part of the original design's intention. In Rosenberger (2014), the case of generic public benches are designed for public seating but are open to many alternative uses, such as providing a place for people to sleep. Therefore, when a bench is purposefully (or unintentionally) designed with "anti-homeless technology" such that it precludes the possibility of sleeping on it, by having slats or slanting the seat angle, for example, the multistability of that bench has shifted from *open* to *closed* with respect to this alternative use. It is important to remember here that technologies do not simply reduce to their designed intentions; we must be careful to avoid this "designer fallacy" and instead embrace that one of the consequences of technologies being inherently ambiguous is that their design has both intentional and unintentional effects (Ihde 1999). A technology is what it does, not necessarily what it was designed to do.

This brings us to ANT and the work it does when integrated in VCE. Well known in the Science, Technology and Society studies field, the ANT tradition was developed and is still championed by Bruno Latour with the primary insight being that technologies or nonhumans actors participate along with humans in all that is sociological, thereby transforming what is possible (Latour 1992, 1999). In particular, these nonhuman actors are inscribed, programmed, and delegated to perform certain functions. Thereby technological objects have a form of agency and that agency mixes with and alters the agency of any human actor to produce a new agency, usually with the intention being to prescribe what human actors are allowed to do within the limits of using the technology. As Latour describes it, this can be approached as a "general descriptive rule," where "every time you want to know what a non-human does, simply imagine what other humans or other non-humans would have to do were this character not present . . . this sizes up the role, or function" of the nonhuman actor under observation (1992, 229). Returning to Rosenberger's example, the anti-homeless bench's agency is modified to make it individually unable to be used as a makeshift bed and collectively a participant in the larger agenda of making public spaces unwelcoming to homeless people. Rosenberger's VCE analysis of public bench design illustrates how design change of seemingly mundane objects has effects that reverberate in larger political power arenas.

There are two points to make at this juncture of bringing in standpoint epistemology. First, it is valuable to see the difference between Whyte's (2015) two conceptualizations of multistability as distinguished by first- and third-person perspectives (which he calls imaginative and practical, respectively), as this is helpful in evaluating the ethicality of a technology's agency. When considering the range of possibilities for how a technology can be used, it is both Whyte's third-person (practical) multistability and Rosenberger's first step in VCE. But this does not adequately speak to the point of needing to illuminate and elevate the first-person perspectives of those who are in positions of minority or marginalization. The second point is that this is exactly where standpoint epistemology is helpful in determining which perspective to evaluate from when using the method of VCE.

To elaborate, standpoint epistemology provides the theoretical basis for describing the reality of subjugation for groups created along lines of politics because that perspective is most able to bring into high relief the often transparent privileges taken for granted by the dominant class (Haraway 1988; Harding 1991, 1993). It demands and gives a "no-nonsense commitment to faithful accounts of a 'real' word" (Haraway 1988, 571) to treat with legitimacy the standpoint taken. In Sandra Harding's *Who's Science? Who's Knowledge?* she reminds us that, "[s]tandpoint theories show how to move from *including* other's lives and thoughts in research and scholarly projects to *starting from* their lives to ask research questions, develop theoretical concepts, design research, collect data, and interpret findings" (1991, 268). Indeed, it is from this perspective—the view from a conventional, fragile, and exploited bike lane—that this chapter was born.

I believe that altering VCE as Rosenberger's current two-step approach to start from the view of the marginalized, rather than just including them in the current first step of listing out the different multistabilities, makes the VCE method better suited to studying the roles technologies play in the life dynamics of the marginalized and the dominant. Starting at the bottom of the hierarchy avoids the pitfall of forgetting how life for those "at the top both organize and set the limits on what persons . . . can understand about themselves and the world around them" (Harding 1993, 56). With this in mind, insight would be lost by only taking a third-person perspective toward multistability if the technology at hand is involved in hierarchical politics because limitations are already in place due to the very nature of how hierarchy functions. Standpoint epistemology therefore directs our attention toward the conflicts and problems that result from the passing down of limitations as lived by those situated in a position of disadvantage.

VCE can successfully integrate standpoint epistemology. I argue that the resultant method now follows the steps of (1) find a case where a multistable technology's agenda is designed for aiding a marginalized actor group but

is overridden by the dominant; (2) describe the larger lived relations for the technology's different actor groups implicated in the case; (3) interrogate how and why the technology's multistable use by the dominant is attained and maintained, being sure to still cross-examine the first-person marginalized perspective with the third-person dominant perspective; and ultimately (4) work toward finding contextualized solutions for making the technology's design more functional by preventing its multistability from being exploited. In this way, the policy recommendations that come out of this method are problem oriented and situated from within the perspectives of those who are subjected to the negative consequences, thereby making the work pragmatic and in transparent allegiance to equity.

In the section that follows, I provide the results of using the VCE method to analyze the practices and meanings of cars exploiting the conventional bike lane's multistability as a parking spot. I describe the view from the bike lane by providing a deep experiential account taken from my standpoint as one of the vulnerable in the car dominant American roadways. Interspliced with this account is my analysis of the actor groups of bicyclists, car drivers, law enforcement, bicycling advocates, and the bike lane as a designed technology. The categories of convenience versus necessity, intentional versus accidental, and illegal versus legal are used to evaluate instances of cars parked in bicycle lanes.

A VIEW FROM A BICYCLE COMMUTE

My former daily commute from 2014 to 2016 was between my home and my office covering the relatively short distance of 1.6 miles (2.6 kilometers). I am a bicycle commuter, so the ride takes about 15 minutes and roughly speaking, there are three legs that are almost equal in distance, but each is distinct in what they reflect about the values and conflicts of the built environment.

First Leg

The first leg of the ride is through my Midtown neighborhood. My neighborhood has families, elderly couples, college students, and working professionals in the houses and apartments. It is what transportation planners call a residential "quiet street" because the speed limit is 25 mph (40 km/h) and the roadways are intended to primarily serve the residents. The pavement is not painted out of reverence for the held belief that lower speeds do the duty in place of lane painting. The exceptions are at the intersections where pedestrian crossings are as worn out as the limit lines (those white blocks meant to show where cars ought to stop at intersections). The neighborhood

is in Atlanta, Georgia, and the neighborhood is an older one. What the houses often lack are driveways and garages; most people parallel park their personal cars on the street in front of their homes. It's convenient as long as there isn't one of the many events at the nearby park. On those days people usually can't park in front of their homes and the street parking demand balloons outward, triggering a domino effect of displacing residents from their supposedly entitled front side street parking. I need to be extra careful on days like this. Car drivers typically look out for other cars and less typically look out for bicyclists, especially when they are eager to find parking and get on with their day. We just aren't seen. I scan my environment to try to see every opportunity for getting hit with the opening of a driver's door, a turning car that might hook me, or any of the other dangers from being present but somehow invisible.

To cross-examine this perspective of the bicyclist is the perspective of the car driver. The average American car commute turns into about 45 minutes spent each day (AASHTO 2015), sedentary in a seat, one car among other cars in traffic, often alone within the car, and usually traveling along the same routes. This is certainly the case in Atlanta, where daily personal car commutes are above the average at nearly 33 miles (53 kilometers) and an hour long (Frank et al. 2007). The car and its ability to facilitate transporting a person between destinations mediates the way a person relates to locations across space and time. More specifically, this is an embodied relation that Ihde would describe as (I-technology)⟶ world (Ihde 1990, 89) which can be seen in many significant, but easy to overlook ways. For one, distances become understood relative to car travel time, for example, "it's a 10 minute drive" rather than being 2 miles (3.2 kilometers) away. For another, the agency of the car transforms the agency of the person behind the wheel from simply being a person behind the wheel into that of a car driver. This transformed car driver's agency is recognized in new abilities, like being able to carry larger loads, being able to meet certain employment criteria of having "reliable transportation," and it explains how a car driver can intend to drive to one place and yet suddenly find themselves turning the wrong way or even arrive at a different destination having given into the colloquial mode of "auto pilot."

If this assembly of a person and their car is reinforced enough over time through habituation, then it becomes sedimented in both instinct and expectations. And so I believe another type of mediated technological relationship is at play here: the car driver's relation to the road. Returning to Ihde, another variant of mediated relation in contrast to the embodied relation described above is the hermeneutic relation, where "the world is transformed into a text, which in turn is read," and simplified as I⟶ (technology-world) (Ihde 1990, 92). Granted, there is a continuum here and I argue that a habituated

car commute is mixed of both the embodied relation of a car driver and the hermeneutic relation of reading the road with its various cues for stopping or going. Ultimately, this multilevel transformation can be so normal or assumed that the experiences of other mode users are unrelatable unless the relationships between self, car, and the road are actively challenged through introspection or breakdown in the form of a crash. (The former is much more desirable than the latter.) Thus, if a car driver has mostly if not always been a car driver in a car dominant society, it isn't just the needs of another mode user like a bicyclist that are invisible, it is the bicyclists themselves that are invisible because they aren't part of the expected roadway script.

Second Leg

Five minutes later and I've traveled about half a mile (four-fifths of a kilometer). In this second leg, I've entered into the official 5th Street bike route. This strip of road is just over half a mile (just over four-fifths of a kilometer) and is recognized as one of the most frequently used bike routes for accessing the campus and this business district. Its edge is marked by the end of the quiet street infrastructure which gives way to the double yellow travel lane dividers, and then a block later, the white painted conventional bike lanes appear 4.5 feet away (1.3 meters) from the right-hand side of the roadway.

Within the American context, the bike lane design standardized following a history of aggregating and federalizing roadway engineering decision-making where two important manual series rose to power. First, the *Manual on Uniform Traffic Control Devices* (MUTCD) became the primary source for all transportation infrastructure objects starting in 1935, later becoming the authority on the matter in 1960s once the two-step federal decisions for requiring all future public and private roads to be compliance with the manual's designs and all federal funding becoming attached to this compliance passed Congress (Epperson 2014; Hawkins 1992). In effect, all roads had to be built by governmental agencies and had to follow the traffic control device regulations centrally supplied by the MUTCD. The second manual, referred to as AASHTO because it is produced by the American Association of State Highway and Transportation Officials, was less focused on the technical specifications of signage and traffic lights like the MUTCD and more focused on guiding the overall process of design and construction methods of traffic infrastructure. As the car became the default mode of personal transport, city design fit around this with the car-oriented MUTCD and AASHTO roadway designs (Epperson 2012, 2014). As a result, the de facto policy for bicycling was "vehicular cycling," where car drivers and bicyclists both use the same paved roadway. Remembering the four types of cyclists discussed earlier,

only 1 percent of the U.S. population are "strong and fearless" enough to effectively navigate these kinds of conditions.

Yet the Bike Boom of the 1960s and 1970s came, and with it came a significant increase in conflict between bike riders and car drivers. Between 1962 and 1972, bicyclist deaths from bicycle–motor vehicle crashes doubled from 570 to 1,100 and injuries tripled from thirty thousand to one hundred thousand (Smith 1974, 3). Under this pressure to adapt, the Institute of Transportation and Traffic Engineers recommended in 1972 that federal designs should include building "bike paths" separate from the roads, "bike lanes" on the roadway, and "bike routes" on wide sidewalks for bicyclists to share with pedestrians, but their recommendations were largely ignored (Pucher et al. 1999). Only the bike lane—flat, without any physical barriers—was included in the updated 1974 AASHTO manual series titled *Guide for Bicycle Routes* and in turn was supported with technical guidelines in the 1978 updated MUTCD chapter IX "Traffic Control for Bicycle Facilities." Together these manuals offered only two options for bike infrastructure for the rest of the twentieth century: the flat conventional bike lanes for SC and vehicular cycling (VC). Given that no other bike infrastructure on public roads that used federal funds was allowed beyond these manuals' designs, the decision for transportation planners was between these two options, the more costly but safer bike lane or the status quo of VC (Lusk et al. 2013). From this came the view that any bike lane was incrementally better than the standard of VC and its "sharrows" (a portmanteau for *share* the road *arrows* painted in travel lanes) and complacency set in (Epperson 2014). The inclusion of bicycle infrastructure design in the MUTCD and AASHTO manuals marks the point where control over on-street bicycle facilities shifted from technical nonexistence and default VC to an era of missed opportunity where standardization led to the limiting and throttling of SC designs.

AASHTO design standards state that because an upright bicyclists is physically 3 feet (1 meters) wide, the technical "minimum operating width" of a bike lane is 4 feet (1.2 meters) though 5 feet (1.5 meters) is considered the "preferred operating width" (AASHTO 2012, chap. 3, 2). But because this stretch doesn't have gutters or on-street parking, exceptions for going below the generally "recommended width for bikes [of] 5 feet" are permitted (AASHTO 2012, chap. 4, 14). "No Parking" signs now dot the edges of the road. But at this edge, I am still in a residential area where many homes don't have driveways. And so, I frequently encounter the first car parked in a bike lane of my commute. I exit the neighborhood by crossing over the arterial roadways, none of which have any bicycle infrastructure (a long and heated debate for these particular roads), and enter into the business district.

The pavement is still painted with its double yellow for dividing the two flows of traffic and the single white for dividing the two modes of wheeled

traffic. But now, the "No Parking" signs above the bike lane are accompanied by other signs with green painted pride that this is a "PATH Foundation[4] bike route." But on Sunday mornings this doesn't matter. The church on this block is an active one, though of course attendance ebbs and flows with the religious seasons. Still, cars line both sides of the street and this practice is stable across time. Car drivers even park directly underneath the "Bike Route," "No Parking," and "Violators Will be Towed" signs. The church itself does have a parking lot (a meager twenty-two spaces with only one handicapped spot) and it is full on these Sunday mornings. But the properties adjacent to the church are abandoned and have large, also abandoned and very open, parking lots. Additionally, there is a paid public parking lot less than a 2-minute walk away just east of the church on the same road. These lots sit empty. Are these drivers even aware that they are choosing what is technically illegal but practically convenient and free over the safety of bicyclists? It doesn't matter if they do this intentionally or accidentally. When they park in the bike lane on both sides of the road they reduce the roadway to effectively one car width straddling the double yellow. This is especially dangerous, and I proceed with extreme caution. During the week I can mostly stay in the bike lane, but on Sunday mornings I remain in the travel lane to avoid the parked car obstructions. Sometimes churchgoers returning to their cars smile and wave at me with genuine kindness. A very pleasant senior citizen once called out, "what a pleasant day for a ride!" while getting out of their car illegally parked in the bike lane. It does not seem that they were aware of the consequences of their actions.

I evaluate the next block as I approach the intersection. Are there construction trucks, food delivery trucks, mail trucks, rideshare cars, or police cars parked in the bike lane? If so, I get into the main travel lane. Even when there is a segment of bike lane open, it can be hazardous to ride in it if I have to pop back into the main travel lane in order to go around something up ahead. I can look over my shoulder to check for cars behind me, use the correct arm and hand signaling to get into the travel lane, and still be put in a risky situation if a car driver doesn't want to allow my merging. Car drivers here are too often remiss in remembering that bicyclists are counted as vehicle operators at both the federal and state level,[5] meaning we do actually have a right to the road. Though it is a tenuous and legally ambiguous one!

Georgia law doesn't make this conflict clear. On one hand, the burden of ensuring safety is on the bicyclist and not the car driver, as a bicyclist must "exercise due care" when avoiding the "hazards to safe cycling" which include "parked or stopped vehicles."[6] On the other hand, the same code in Georgia law also states that car drivers "shall yield the right-of-way to persons operating a bicycle upon a bicycle lane."[7] The legal landscape is admittedly difficult to navigate, especially when Atlanta code makes "parking

within a designated bike lane is prohibited"[8] look like a strange inside joke next to the prevalence of this practice and the lack of law enforcement. And it does seem like the default answer to the question of whether it is illegal to park in a bike lane is "yes," as it is only made illegal when "a local agency prohibits parking and erects signs accordingly" (AASHTO 2012, chap. 4). A motorist could therefore park legally in a bike lane in the morning and park illegally in a bike lane in the afternoon if they drove into a city that prohibits it. The only difference being a "No Parking" sign that is 12 × 18 inches (300 × 450 millimeters) (U.S. Department of Transportation's Federal Highway Administration 2003, 9B-3) that may or may not be visible from the pop-up parking spot. One consequence of the hybrid embodied and hermeneutic relations of car driver on standardized roadways is poor reading. In the imaginary example of a car driver parking legally and illegally in a bike lane in different places, they may be so habituated to the practice that it is expected to be legal, thus signs saying otherwise can be in a blind spot. Present, but unseen.

No. It's better to remain in the travel lane and forgo the bike lane when several vehicles are parked in them, especially when restaurant delivery trucks and construction trucks are parked on *both* sides. Just like in front of the church, this reduces the two-lane traffic to a single lane that straddles the double yellow. Riding a bicycle in this bike lane up until the obstruction effectively places me in a shadow for oncoming traffic and one too many close calls have happened. Police officers are present to supervise the construction of a mixed-use building here. Over time, they recognize me and wave at me as I pass by. So I talked with some of them about the cars parking in the bike lane, how unsafe it makes the road for bicyclists and other car drivers alike and that it is technically illegal. They would get "laughed out of court" if they ticketed these construction trucks or delivery trucks. They are too important for local business and economic development. And besides, where else are they supposed to go when the job needs to get done? Fair point.

But is it technically illegal? Specifically, Atlanta code states that the practice of parking in a bike lane is illegal "except in the course of official duties."[9] It can be argued that anything a police officer does while on duty falls under this exception clause, however distasteful it may seem. But what then about delivering goods or constructing a building? Certainly, those are part of the required duties for those respective drivers, but are they official in any meaningful way? I was unable to get an answer from the police officers or from the parking enforcement hotline. What I did find is the federal implication that they are not, insofar as AASHTO recognizes that "[s]ome state codes allow buses, garbage collectors, and other public vehicles to use bike lanes temporarily" as a "momentarily stopped vehicle" (AASHTO 2012, chap. 4). Delivery and construction trucks are not public vehicles and therefore are not included in the exception clause. But in roadways that don't account for how

their needs are different from public vehicles, competition is forced between business schedules and surviving a bicycle commute.

I approach the next intersection from a two-way road to a four-lane, one-way road that peels off into another discontinuous two-way road. Bicyclists were provided with the enhancement of green paint in the bike lane just around this corner and a special button to get a street crossing light for this disjointed mess of an intersection. These enhancements are recognized as designs that exceed the federal minimum standards, but they feel relatively worthless due to how incomplete the implementation is for their users. There's a manhole in this bike lane with a 4 inch (10 centimeters) sunken edge at the zenith of the corner transition from the small road to the large. Hit this with my wheel the wrong way, and I'll crash. Going just outside the manhole's trap means edging closer to car traffic while turning—a scary prospect. If I manage to make the corner, I face the road debris common from being adjacent to the thick band of 35 mph (56 km/h) car traffic and so again ride the outer edge of the bike lane. After pressing the crossing button, a bicycle greenlight appears at the same time that opposing car traffic get their green turn signal. Crossing bicyclists and turning car drivers are both signaled into conflict. The road on the other side is proverbially greener than this green painted pavement. If the light isn't red when I approach the disjointed intersection, I will cross over the four lanes, get into the left most lane, and turn down the disjointed 5th Street so I can continue my ride to campus. It's safer and legal to "take the lane" as it is called than to use that bike lane. Legally requiring bicyclists to use the separated bicycling infrastructure when it is present, or mandatory use laws, exist in seventeen states (McLeod 2013). Some states like New York, Florida, California, and Oregon have mandatory use laws in general, though some exceptions exist with respect to avoiding hazards. Georgia is slightly different in that state code grants municipalities the authority to put these mandatory use laws into effect.[10] Thankfully it's still legal in Atlanta to choose to exit a bike lane.

The next two blocks are a mixed restaurant and technology hub park known as Tech Square and it is one of the most dangerous sections for this commute during the week. It was prominently featured in the Atlanta Bicycle Coalition's *Unblock the Bike Lane* campaign and the report by the same name (Atlanta Bicycle Coalition 2018). At the campaign's launch in 2014, ABC executive director Rebecca Serna argued that Atlanta bicyclists have such a small and disjointed network of bike lanes to start with making it "galling to see our few dedicated spaces for bicycles being used as 'pop-up' parking" (Serna 2014, 5). Part of the background context of this time was then current mayor Kasim Reed's 2013 pledge and $2.47 million investment to make Atlanta one of the top 10 bicycle-friendly cities in the United States by 2016 (Mayor Kasim Reed's Office of Communications 2013). In light of this signaling, Atlanta was selected by the national advocacy group PeopleForBikes

to be featured in their third round of the Green Lane Project where designs outside of the AASHTO manual, like protected bike lanes and green paint inside the bike lane, were permitted for use (PeopleForBikes 2014).

And so, Serna's argument that "lots of people in Atlanta right now are trying to build the kind of city where anyone can travel without the use of a motor vehicle," was true, but this requires understanding that "bike lanes, like sidewalks, set aside space to make it safer and easier to bike places. Every time someone parks in a bike lane (or on a sidewalk!), it threatens that progress" (Serna 2014). Serna was trying to enlist pedestrians as an ally in the fight against the pop-up parking agenda by tying together a group along the lines of those who are nonmotorists as a whole. What's more, when she states that "why have bike lanes in the first place if they're not going to be respected?" she is questioning law enforcement's adherence to their own prescribed duties. Together, she was trying to extend the actor network of bicyclists to have common allies with pedestrians and maybe shame the police into action. This coalition building effort continued into the 2018 report, where ABC argued that "authorities responsible for managing Atlanta's bike network treat this as a transportation and mobility issue, not simply a bicycle issue" (Atlanta Bicycle Coalition 2018, 3).

Returning back to daily lived experiences of those years, car drivers park in the bike lane commonly, but the materiality of the bike lane's design produces different dangers here. For the first block, the bike lane is just shy of 8 feet (2.4 meters) wide. It is so wide that entire cars can park and fit inside its bounds, and they frequently do. Ironically, it's in front of Georgia Tech's Parking and Transportation Services building, which is also the department charged with managing alternative transportation for the campus. Sometimes personal car drivers use it as a travel lane, perhaps accidentally or perhaps intentionally, they take advantage of the extra wide bike lane. When they are stuck behind a car trying to turn left from the single lane that serves turning and forward travelling traffic yet doesn't have a turn signal, congestion leads to frustration and the desire to get around is strong. More than once I've had to brake and kick a car that was beginning to enter the bike lane as I approached. Consider how close I had to be for that situation to be resolved with a kick. It's somewhat absurd. What's the point of ringing a bike bell when car drivers with raised windows are acoustically buffered from their environment? But they will feel and hear a kick to their extended body of their car. To be sure, this has certainly upset some car drivers but I'd rather they be upset and neither of us hurt than crashing—with me being more likely injured than them—due to their careless and illegal behavior.

The second block of Tech Square places the bike lane *between* the travel lane and the dedicated parallel parking spaces and bus stops. Meaning all cars must *cross the bike lane* to get into and out of parking, which is the only option given in the federal design manuals (AASHTO 1999, 2012).

Moreover, the bike lane is a mere 4 feet (1.2 meters) wide, when the AASHTO manual used for when this stretch was restriped clearly states that "a bike lane next to a parking lane shall be at least 5 feet wide [especially] in cities where illegal parking in bike lanes is a concern" (AASHTO 1999, 23). After over a decade of anticipation, AASHTO released an updated 2012 edition where bike lanes in these situations should actually be 5–7 feet (1.3–2.1 meters) wide (AASHTO 2012, chap. 4). Old roads are ripe for retrofit but remain grandfathered in place.

Being so close to campus, the free commuter buses have frequent stops and they rarely manage to pull all of the way out of the bike lane and into the bus stop. It isn't uncommon to see a car or delivery truck in the bus stop with their hazards on (free parking!), so it isn't always negligence on behalf of the bus driver that results in buses blocking the bike lane. Nevertheless, they are an unpredictable obstruction willing to return to the travel lane as I pass on their left within the one lane available. They have a schedule and their employment to keep as a top priority. Personal car drivers, on the other hand, seem apathetic when they park with their car's backend in the bike lane. It reads that they pulled in to the parking spot but didn't bother to complete the parallel parking moves. Frequently they are there waiting to pick someone up, so they'll "just be there for a minute" whenever I do put in the effort to ask. Plus, there's always the risk of a stray car door being opened into the bike lane. It is because "motorists do not always fulfill their responsibility in this respect" that AASHTO recommends bike lanes in these types of streets to be 5–7 feet (1.3–2.1 meters) wide such that "bicyclists can avoid this type of crash by riding on the left side of a bike lane, outside the range into which opened doors of parked vehicles could extend" (2012, chap. 4). The given width of 4 feet (1.2 meters) is inadequate for following this recommendation. I prefer to bike in the travel lane during the week. The plain bike lane is a place of manufactured conflict.

Third Leg

I cross a bridge over the interstate and in doing so, cross onto campus. This is the last leg of my commute. To get to my office, I must turn left and can only do that by taking the left turn travel lane. I look over my shoulder, signal, and then either must cross from the bike lane, over a travel lane, and into the left turn lane, or start in the travel lane and just simply change lanes into the left turn lane. Most of the time, this is manageable. If I'm starting from the bike lane, I have less leverage to work with and it isn't uncommon for car drivers to feel compelled to speed up and pass me instead of letting me cross over. One such time, I checked over my shoulder and saw a truck far enough behind me to safely enter into the travel lane. Apparently enraged, the driver

sped up, threatening to hit me with their car. All in the short amount of time needed for me to get into the turn lane. They had sped up not to save time, as the light was already red, but simply to intimidate me. While both of us waited for the light to change, they yelled out from the car window, "There's a bike lane *right there!*" followed by the legally unaware, "Stay out of the road!" *The bike lane is off to the right, I'm turning left, and what I'm doing is legal. What you did was dangerous*. It's better to think these responses than speak them when dealing with someone willing to use their car as a weapon. But the illegality of harassing a cyclist because of their status as a cyclist is only codified in a minority of states[11] and municipal law in a few places.[12] But not in Georgia and not in Atlanta. Basic aggressive driving legislation would apply but remains next to worthless in these situations; it simply does not hold up in court. Besides, what good would adding a new law protecting cyclists from road rage do? Parking in bike lanes is illegal in Atlanta municipal code but people violate it without repercussion frequently. Who is important enough to meaningfully care about the humdrum of street harassment? This kind of conflict underlines why there is a need for the built environment to be the mediator between different mode users.

Once I exit the fray of campus boundaries, the route is easier. Campuses are commonly more a place for pedestrians and bicyclists than for cars (Bonham and Koth 2010). I served on the Bicycle Infrastructure Improvement Committee for a few years, where I gleaned insight into the bureaucracy of how a campus works; how many of the career employees who genuinely care about bicyclists live off of long-term dreams in order to get through the daily grind of perpetual compromise and incrementalism. The dream is to eventually make the road that rings through campus a cutoff point where no cars can go inside the heart. For now, the route to my office is a mix of bike lanes, sharrow painted mixed travel lanes, and back-alley paths. Skin thickened from successful defensive riding, I try to sit down, work, and not think about the inevitable ride home in the dark. I know that my experiences are one among many, but I also know from the lived community and the academic literature that it is typical. The irony that this route is rated blue for "least difficulty bicycling" by the Atlanta Bicycle Coalition[13]—and that this is accurate in comparison to other Atlanta bike routes—is not lost on me. The fact that it could be worse is true, but that doesn't protect anyone.

RESISTING EXPLOITABLE MULTISTABILITY

A person can develop an embodied relationship with their car to become a car driver and doing so in a car dominant culture leads to them becoming a loyal participant in the car driver actor group. This is a common and normal trajectory

for people in the United States with respect to their mode of transportation. The roads seem to exist solely for meeting their needs and in many places, that is the case. Their hermeneutic relationship to the road is largely a given. Parallel but in contrast to this is the bicyclist, where a person can develop an embodied relationship with their bicycle to gain the identity of being a bicyclist. When considering the normative dimension of what values build the built environment, these two actor groups are in competition. When AASHTO states that "all roadways should be accessible by bicycle" (2012, chap. 2) and Georgia law echoes that "bike paths shall provide accessibility to destinations equivalent to the use of the roadway,"[14] the intention is to provide this hermeneutic relationship for both people who drive cars and people who ride bicycles. But that's not the experienced reality for bicyclists who have to depend on the conventional bike lane. It is an object of materially weak agency that is exploited by the dominant actor group of car drivers. This breakdown is seen in all the ways a conventional bike lane is built as a manufactured conflict zone, particularly when considering the alternative use of car drivers using bike lanes as free parking spots.

As discussed earlier, protected on-street SC infrastructure is critical for activating the latent demand of nearly half of the U.S. metro population's desire to mode shift onto a bicycle for at least some of their trips. Many roadways already have conventional bike lanes and still more have the potential to be successfully retrofitted into a complete street by adding bike lanes. This approach still remains more feasible than creating off-road SC infrastructure or implementing enough traffic calming to make VC safe for all roads. Operating on the trajectory that we find U.S. roads means the most realistic and positive goal possible is to think of conventional bike lanes as a blank canvas, as a starting point. Rather than being a failed design, they carve out space in the roadway and give us something to work with through adaptive retrofitting. This raises of the question of just how protected SC infrastructure needs to be while still being grounded in the larger social and legal context of how American roadways are used. Just how strong should the material agency of a bike lane be?

The result of this VCE analysis of bike lanes as a public space technology reveals three main but interrelated design conclusions for striking the balance between bicyclists and car drivers. First, SC facilities should be resistant against illegal and convenient parking. Second, this infrastructure should still remain open to legal and necessary parking. And third, in cities and states that have legislated beyond the default by making it illegal for nonpublic vehicles to park in bike lanes, the possibility of unintentionally misreading the road's script should be reduced to the point of making a car driver face the decision of parking illegal in a bike lane. VCE instructs us to make bike lanes resistant to exploitation, not closed to legitimate alternative uses. In doing so, the design intention is refocused around protecting a marginalized group and promoting equitable access and multimodality values.

How do these three design conclusions apply to the specific examples illustrated in the bike commute account provided? Consider the church, where car drivers were parking illegally in the bike lanes out of convenience. Free and paid public parking existed a few minutes' walk away, but those car drivers chose to park in the bike lanes because doing so offered some protection for their cars from the flow of traffic while placing them immediately in front of their destination. Here, a bike lane could be augmented beyond the minimum but subpar federal standards. The main actor offering such designs is the National Association of City Transportation Officials (NACTO) manual, which began offering bike infrastructure designs in 2011. For example, NACTO includes green colored paint, as its benefits are seen in how adding green to bike lanes "increases the visibility of the facility, identifies potential areas of conflict, and reinforces priority to bicyclists in conflict areas and *in areas with pressure for illegal parking*" (NACTO 2011, 254 emphasis added). What makes this roadway script alteration work hinges on being visibly distinct from the blacktop of normal roads, but importantly it has different effects on the phenomenology of a car driver. The green paint, especially if it follows recommendations of being retroreflective and wear resistant, is so striking and jarring that it forces the car driver into seeing it thereby eliminating the possibility of unintentionally reappropriating a bike lane as a parking spot. A consequence of this is that a car driver who parks in a green painted bike lane has obviously chosen to do so, which can activate a sense of public shame if not outright attracting parking enforcement. An additional benefit of this treatment layered on top of a preexisting conventional bike lane is that it drives people to pay for parking, which helps both the city in recouping costs and encourages people to consider using less expensive modes of transportation, both of which are key for funding and motivating a multimodal urban environment.

Though paint aids in altering the visual script of a roadway, it does not impact the felt physical script. By adding a physical barrier of some form to a bike lane, the agency of this on-street SC produces the new category of cycle tracks. Protection methods recognized by NACTO can come in the form of raising the pavement or lining the cycle path with spaced plastic delineator posts, rigid bollards, and heavy planters often inside of a buffer (NACTO 2011). Where raising the pavement literally elevates bicyclists within the hierarchy of the road, which is of symbolic importance and felt through the tires of a car if a driver crosses over, it still is relatively weaker than the other forms of protection like bollards or planters.

Returning to the one block with an 8 foot (2.4 meters) wide bike lane in Tech Square, which was rampant with delivery trucks, parked personal cars, motorists attempting to reclaim a bike lane into a forward travel lane, and scouting Georgia Tech Police Department cars, enhancements have been added to this previously extremely easy to exploit doublewide conventional

bike lane by converting it into a protected bike lane (i.e., a cycle track). In 2017, plastic delineator posts were installed along the length of this block (except for at the parking lot entrance/exit) and designated a "Loading Zone Only" space across the street for delivery trucks. Following the rising trend of "flexible design approach" finally advocated at the national level, as seen in the 2015 release of the Federal Highway Administration's (FWHA) *Separated Bike Lane Planning and Design Guide* (U.S. Department of Transportation Federal Highway Administration 2015, 21), the delineator posts proved to be helpful for only part of the block. Car drivers who could not wait for their turn to travel forward would drive over the posts and they remained down, thereby returning the facility to an unprotected bike lane now scattered with hazards. In 2018, another retrofit further enhanced this bike infrastructure by reducing its width to include a section of a 3 foot (1 meter) wide buffer filled with heavy planters. Cars cannot drive over this protection nor can they fit inside the newly reduced bounds. This bike lane reiterative retrofit in combination with designating a loading zone makes the current cycle track resistant to convenient and illegal exploitation (motorists), necessary and illegal exploitation (delivery truck drivers), and convenient but legal exploitation (nonemergency response vehicles).

Remember the mental image of knocked down plastic delineator posts. This image is a frustrating and powerful one. Bicyclists often feel indignant that their physical protections have been overridden by a car driver who placed their wants over the safety of cyclists. Where NACTO's *Urban Bikeway Design Guide* only states that "raised medians or other barriers can also provide physical separation" beyond these delineator posts (2011, 62), the FWHA's *Separated Bike Lane Planning and Design Guide* recognizes "their durability and aesthetic quality can present challenges and agencies may consider converting these types of buffers to a more permanent style when design and budgets allow" (2015, 84). The alternatives offered in order of increasing protection for bicyclists are raised lanes, planters, bollards, parking stops, raised medians, concrete wall barriers, and parked cars themselves (by moving the bicycling facility to the right of the column of parallel parked cars rather than to the left as AASHTO has historically recommended) (ibid., 83–8). Though this increased array of options is certainly a welcome change from the extremely restricted AASHTO and MUTCD history that used to be hegemonic, what is lacking from this technical manual is the consideration that there are times when necessary and legal parking in bike facilities by emergency response vehicles occurs. The emotional response of indignation when seeing delineator posts knocked down changes if it wasn't an aggressive motorist but an ambulance driver who knocked them down.

There is a limit for how protected SC facilities ought to be when activating the latent demand of bicycling, and it is by cross-examining the various

reasons for cars parking in bike lanes that the argument changes from "how protected can we make this bicycling facility?" to include "while still keeping it resistant to exploitation but open to legitimate alternative uses?" This is the kind of productive reframing that VCE promotes by providing the phenomenological, power laden, and reality constructing interpretations of these design alternations as compared to just the technical reasons. Having a more conscious relationship to the norms of transportation and interrogating planning decisions through these lenses helps to force them visible and open to inclusive change.

NOTES

1. It is worth noting that there is a growing campaign for limiting street speeds to 20 mph and 30 km/h, for the sake of whole numbers. 20's Plenty for Us NPO. n.d. "20's Plenty for Us." Accessed February 27, 2019. http://www.20splenty.org.

2. Though I recognize other mode users do exist, the problem-oriented approach of this chapter urges focusing mainly on the dynamics of bicyclists and car drivers.

3. The footnote #20 from Rosenberger (2014) reads,

> "This introduces epistemological questions into postphenomenological thought—a step forward, I think, for this account. How to productively combine and cross-analyze situated perspectives to draw out biases in the analysis of multistable technology is a question that I cannot address here. But it is clear upon whose work such a project should be built (e.g., Code 1991; Star 1991; Haraway 1991; Harding 1991; Alcoff 1997; Hartsock 1998). It seems possible to utilize the insights of feminist standpoint epistemology and feminist phenomenology to develop ways to 'operationalize' this kind of analysis, as Harding would put it, for considering the situated biases of various actors."

4. The PATH Foundation was founded in 1991 to help bolster Atlanta's image by developing a trail network for bicyclists and runners in time for the 1996 Olympics. Decades later, they continue to help build out a network of off-road multiuse paths and on-road bike routes.

5. This is cited at the federal level in U.V.C. n.d. § 7-11-1202 and at the state level in O.C.G.A. 2018 § 40-6-291 Traffic Laws Applicable to Bicyclists.

6. O.C.G.A. 2017 § 40-6-294 Riding on Roadways and Bicycle Paths.

7. Ibid.

8. Atlanta Municipal Code 2019 Chapter 150 Article III Sec. 150-65 Bicycle Routes, Bicycle Lanes, and Multi-Use Trails.

9. Ibid.

10. O.C.G.A. 2017 § 40-6-294(d) Riding on Roadways and Bicycle Paths.

11. Oregon, Delaware, Illinois, Maryland, Nevada, New York, Tennessee, Washington, Connecticut, Hawaii, Utah, Vermont, Massachusetts, and Michigan as of the time of this writing in 2019.

12. For example, Los Angeles Municipal Code 2011 Article 5.10 Chapter IV Municipal Code to Prohibit Harassment of Bicyclists Because of Their Status as Bicyclists.

13. Atlanta Bicycle Coalition. n.d. "Atlanta Bicycle Map 2013–2014." Accessed February 26, 2019. http://issuu.com/lcaceda/docs/bicycle_map_2013?e=0/6485352.

14. O.C.G.A. 2017 § 40-6-294 Riding on Roadways and Bicycle Paths.

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Part II

EXCLUSION

Chapter 4

Sartre's Keyhole and the Politics of Multistable Space

Robert Rosenberger

Jean-Paul Sartre writes: "Let us imagine that moved by jealousy, curiosity, or vice I have just glued my ear to the door and looked through a keyhole" (1943, 347). This is of course the start of his iconic meditation on our sense of self and how it changes through the act of looking, and through the experience of being seen. While we may take issue with the particulars of his metaphysics, Sartre always had a knack for capturing the phenomenology of everyday life through the analysis of revealing examples. In his description of the act of spying through the keyhole, he gets hold of the way people can become immersed in their activities, and how they can grow more aware of the thing they are doing than they are of themselves in the process of doing it. He writes: "My attitude, for example, has no 'outside'; it is a pure process of relating the instrument (the keyhole) to the end to be attained (the spectacle to be seen), a pure mode of losing myself in the world, of causing myself to be drunk in by things as ink is by a blotter" (Sartre, 1943, 348). The voyeur is immersed in the perception of the content of the room, lost in the act of voyeurism.

Then, in a twist, the story shifts: "all of a sudden I hear footsteps in the hall. Someone is looking at me!" (Sartre, 1943, 349). Sartre's voyeur has been caught! This sets up an exploration into how our sense of self, our sense of bodily presence, and the shape of our lived experience can be subject to sudden change. Since he has been caught in the act, Sartre's voyeur becomes suddenly aware of how he must look to other people, guilty of voyeurism, and with nowhere to hide. If just a moment ago he had been entirely lost within the spectacle beyond the door, now that immersion has been shattered and he is consumed by his predicament.

Sartre's example of the voyeur draws out many of the dynamics important to the study of the phenomenology of technology and space. This story

revolves around the usage of a technology for a purpose different from that for which it was designed: the keyhole is used as a peephole. It involves immersive experience, a kind in which the usage of technology substantively reorganizes the user's relationship to the surrounding space, with some aspects of experience dropping into a less noticed background. It includes a shifting relationship to not only that central device, but also to the space of the hallway, that is, his architectural surroundings. And it includes as well the voyeur's shifting relationship to his awareness of himself within that space. In addition, crucially, this example includes the reorganization of a person's relationship to technology and space due to the actions of another person. Philosophical theories of technology, and phenomenological theories of technology in particular, should be able to approach all of these kinds of issues.

Here I want to reconsider the example of Sartre's voyeur specifically in terms of its concrete technological situation. The story of the keyhole voyeur is commonly understood (and is offered by Sartre himself) as revealing something about the nature of consciousness, and the nature of "the look," and the status of ourselves as material things in the world. I want to additionally approach this story as an example of technological mediation. I want to examine the keyhole itself as a device in use, and one that multiply mediates human experience, shaping the world in different ways in different contexts. That is, I want to draw attention to the keyhole itself as a concrete material artifact. This will enable consideration of the politics of this device, as well as the politics of the surrounding architecture.

To do this, I suggest we turn to the "postphenomenological" perspective. Postphenomenology conceives of technological mediation in terms of the many different ways that technologies inform and transform our relationships with the world. According to Don Ihde, the godfather figure of this perspective, technologies "are *multistable*, that is, they have structured ambiguities that allow what first appears as a 'same' technology to be differently situated and have different trajectories" (2010, 126). As with the keyhole used as a peephole, technological mediation never reduces to only one thing. Peter-Paul Verbeek, another central figure within the postphenomenological perspective, goes so far as to suggest that technological mediation actively "coshapes" both the user and the world, making each what they are through the mediation process (2011). Building on this perspective, we can consider how technologies like the keyhole enable certain possible actions, change a user's relationship to the world, and render the various players into who they are: the peephole, the victim of voyeurism, the voyeur, and then the caught red-handed, and so on. We can use these ideas to deepen our descriptions of the experience of technology usage and its relationship to the experience of architectural space.

But the richness of Sartre's account of the voyeur also pushes the limits of the postphenomenological perspective. I suggest that the postphenomenological framework of concepts, as it stands, would strain in its attempt to capture some of the dynamics of this example. And these points of strain can help us to map out some of the cutting edges of this perspective. In particular, this account of technological mediation struggles in its conception of the experience of other people through technology. It also is not itself a political theory, and it can stumble in its attempts to capture examples in which people are using technology as a form of control.

To explore these frontiers of the postphenomenological study of technology and space and architecture, I suggest we turn to the topic of what could be called "hostile design." Sometimes also called "hostile architecture," this refers to the construction of the objects of public spaces in a way that works to control how they may be used, and thus also control who may make use of such spaces. This idea is usually used in criticism of cases in which public space has been designed to target particular vulnerable populations for exclusion. I suggest that it can be fruitful to approach this topic in terms of the postphenomenological notion of multistability, and that doing so forces a kind of reckoning with the political nature of this idea.

In particular, I would like to put some thought into one of the most paradigmatic, and also most controversial, examples of hostile design: security cameras. Following Sartre's recognition of the power of the perception of others, we can consider how the presence of cameras in public spaces can work to enforce particular behaviors, and can at times do so in accord with hostile agendas that discriminate against vulnerable populations.

MULTISTABLE OBJECTS AND SPACES

One of the most crucial and underanalyzed aspects of the story of Sartre's voyeur is that it centrally relies on a technology—the keyhole—that is being used for a purpose different from that for which it was designed. The keyhole wasn't made for voyeurism, but enables it nevertheless.

Sartre's example of the keyhole voyeur can be used to instantiate the postphenomenological notion of multistability, and do so in a way that draws out some of what can be useful about this idea. Broadly put, the term "multistability" refers to the way that a technology never reduces to only those uses and contexts intended for it by its designers and manufacturers. Any technology can always be used for multiple purposes, can always fit into multiple contexts, and can always develop in different ways along different trajectories. As Lars Botin writes, "The complexity of these trajectories is obvious due to the amount and diversity of humans, machines, practices, functions,

needs, requirements and wishes, which are themselves multistable" (2015, 101). The notion of multistability simultaneously also refers to the inherent limitations of a technology's potential meanings and uses: a given technology cannot take on just any meaning or be put to just any purpose. As Ihde puts it, a technology's multiple stabilities are not "indefinitely extendable" (1993, 37). That is, although possibly extensively multiple, our relations to technology are always limited to particular experientially stable ones, or "stabilities." In what follows, I argue that it is important to think about the multistability of objects in public spaces, and to conceive of those spaces themselves as multistable technologies. This sets up a political project of exploring how certain uses of spaces and objects are at times shut down through social and material practices of policy and design and surveillance by those in power.[1]

Returning to the story of Sartre's voyeur, let's first consider the keyhole itself as an example of a multistable device. It is used for two different purposes in Sartre's story. First, there is what Ihde refers to as the "dominant stability," the usage for which a technology was designed and manufactured, and the purpose for which it is most commonly taken up. The dominant stability of the keyhole is its usage as the space into which one inserts the key to unlock the door. But in the story of the voyeur, we see an alternative stability: the keyhole-as-peephole. In its usage as a peephole, the keyhole enables Sartre's voyeur to peer into the closed room without himself being seen. And the fact that this stability is an alternative one is something that contributes in this case to its efficacy; the target of the voyeurism may not expect the keyhole to afford spying. Postphenomenological research has over the years investigated the multistability of a variety of concrete technologies and practices, from scientific instrumentation (e.g., Hasse, 2008; Rosenberger, 2011, 2021), to medical devices and practices (e.g., Forss, 2012; Rosenfeld, 2015; de Boer & Slatman, 2018), to smartphones and computing (e.g., Rosenberger, 2009; Wellner, 2016; Irwin, 2017; Warfield, 2017; Aagaard, 2018), to robotics (e.g., Hasse, 2015; Jørgensen & Tafdrup, 2017; Blond & Schiølin, 2018).

For those of us engaged in practical research on the nature of technological multistability, there remain open methodological questions. For example, as Kyle Powys White has pointed out, it is important to remain mindful about how one's target of investigation is chosen, and what the consequences of those choices may be (2015).[2] Whyte refers to this as an investigation's "pivot," the object of analysis that is under scrutiny *as* multistable. We can see these issues at work when we consider Sartre's example of the keyhole voyeur specifically in terms of technological mediation. We've noted that the keyhole itself can be conceived as a multistable mediating technology. But we can also step back and consider in this same story a different potential pivot: the hallway. When we consider the hallway itself as a multistable

mediator of experience, then we are exploring the multiple possible relationships users may have with the technology of the surrounding space, the technology of the built environment, the technology of architecture. In this new investigative context, the keyhole becomes just one background element of the mediated experience of the immediate area. And as Sartre's example shows, in addition to its everyday and "dominant" usage as a corridor, we see the hallway used in Sartre's account as a perch from which one can conduct keyhole voyeurism, and then, we see it shift yet again into an open space in which that voyeur may be caught in the act with nowhere to hide.

It is important to keep our eye on exactly why it can be useful to investigate technology in terms of its multistability. For one, the notion of multistability can helpfully undermine totalizing or essentializing accounts, accounts that allegedly fail to appreciate the fact that technology can mediate experience in more than only one way. Don Ihde's own uses of multistability tend to be of this type (e.g., 2010, 2016).

But I want to focus on another usage of multistability: a tool in the effort to uncover elucidating information about particular cases. For example, I have argued across a series of papers that it can be helpful to contrast a technology's different stabilities against one another (a method I've called "variational cross-examination") (e.g., Rosenberger, 2014, 2017d; Aagaard, 2017). Postphenomenological case studies into technological multistability often aim to do more than merely demonstrate the philosophical claim that a device can be used for more than one thing: they seek new and elucidating things about the case. And, in pragmatist spirit, we don't even need to appeal to foundational truths or transcendent essences to do so. We can learn things about particular stabilities by comparing them with other stabilities. In particular, we can often learn much about the dominant stability through its comparison with alternatives.

Let's consider a few of the different aspects of stabilities that are subject to contrast.

Forms of Human–Technology Relations

For example, we can consider the contrast between the general "forms" of human–technology relations at work in the different stabilities in Sartre's case of the keyhole voyeur. Ihde has influentially identified several of these, such as what he calls "embodiment relations," in which a user's bodily senses and abilities are transformed and extended through technology usage (e.g., 2016, 112).[3] The keyhole when used in its dominant door-unlocking stability is an example of an embodiment relation. The key in hand becomes almost an extension of the user's bodily experience; the user's experience is outspread through the key as it enters the keyhole, encounters the resistance to its turn,

and is presented with the sensation of unlocking the door. Sartre's example of the keyhole-as-peephole stability is also an example of an embodiment relation. With an eye pressed against the hole, the device offers a transformed perceptual experience, one in which the voyeur is afforded the capacity to see through the door and do so in such a way that he is not himself seen in return. Like other perceptual devices such as eyeglasses or a telescope, the keyhole extends and transforms the user's body-perceptual capacities in specific ways, magnifying this person's ability to perceive through the door, but, as we'll see, at the cost of crucial tradeoffs as well.

Engagement with the keyhole-as-peephole stability involves specific bodily comportments and understandings, what we can call a kind of "relational strategy" (e.g., Rosenberger, 2009, 2014). To embody the keyhole-as-peephole stability, one must understand and take up the device in a way different from its embodiment as a locking mechanism. When using the keyhole in its dominant locking stability, the general bodily comportment is one which involves holding a key, engaging the lock, pushing the door, and so on. In contrast, Sartre considers in detail the relational strategy involved in taking up the keyhole in terms of its peephole stability. He writes: "The door, the keyhole are at once both instruments and obstacles; they are presented as 'to be handled with care'; the keyhole is given as 'to be looked through close by and a little to one side' etc." (1943, 348).

The transformed visual perspective enabled by the technological mediation of the keyhole is neither complete nor innocent. It is a specific kind of voyeurism afforded by the keyhole, one in which the voyeur is physically close to the "spectacle," positioned just on the other side of the door. The view into the room is presumably incomplete, and is shaped and restricted in specific ways by the limited vantage point afforded by the keyhole. The sound is probably at least partially muffled by the door. And crucially, the voyeurism is one in which the voyeur can see through the door without in turn being seen by those on the other side. And yet at the same time, it is exactly this comportment, this relational strategy, this particular arrangement of bodily and perceptual engagement with this device that also sets up the voyeur to be caught. The voyeur is caught in the hallway while crouched awkwardly, culpably, and unmistakably in the act of voyeurism.

When we shift our investigative pivot and conceive of the hallway itself in terms of its multistability, we find a different form of human–technology relation at play; the voyeur interacts with the hallway through what Ihde calls a "background relation," one in which the technology informs the context of the user's experience but is not itself directly engaged (2009, 43). The hallway—that surrounding space and architecture of this case—does actively mediate experience, but only indirectly.

The Field of Awareness

Let's consider another feature of stabilities subject to cross-examination: what emerges as more or less present within a user's experience. Of course this will be different for different users. But it is still possible to consider the kinds of organization of a user's overall awareness that might generally be involved in the engagement with one particular stability of a particular device compared to another. For example, we can consider which aspects of experience take on a degree of what Ihde calls "transparency," or the extent to which something draws back and becomes less present within a user's awareness (2010, 124). As Daniel Susser puts it, "once we become adept at using technologies, the technologies themselves recede from conscious attention and perception" (2019). To continue with the keyhole example, if one uses a key to unlock a door that they have never encountered before, then the key itself in-hand may take on an explicit presence in the effortful moment in which one glides it into the keyhole and attends to the lock. Now let's also consider a different user of this same device engaging that same stability, but a person for whom this usage of this device in this manner is a standard part of a daily routine, something which has become steeped in bodily perceptual habituation. That is, imagine this person uses this key on this door all the time. Imagine that it has become commonplace for them to walk up and unlock this door. In this case, the key and keyhole usage itself may take on a considerable degree of transparency (at least on those days that all the parts function as expected).[4]

Contrast these aspects of user awareness with those described by Sartre in his account of the voyeur. Sartre makes an important observation that when using the keyhole for voyeurism, the content of the room beyond the door, that "spectacle to be seen," stands forward and constitutes at least in some moments the practical entirety of what is present. The keyhole itself, that is, the mediating technology that makes this voyeurism possible, is in these moments almost entirely transparent. Indeed, phenomenologically speaking, it is more accurate to say that the object of the voyeurism is immersive, the user "drawn in" and "losing myself in the world," as Sartre says. In a language I've been developing for the analysis of immersive technologically mediated experiences, such as talking on the phone or reading books, we can sometimes describe particular aspects of experience as coming to compose a user's "field of awareness" (Rosenberger, 2012, 2017c). It is less true to experience to say, in this case, that the keyhole, and *also* the door, and *also* the hallway, and *also* the voyeur's sense of self and place *all* take on transparency. In this case, the transformation of the organization of the voyeur's awareness is a radical one. The object of immersion has stepped forward and occupied the near entirety of that which is significantly present.

Contrast this once more with a third example: the shift in pivot to the hallway, and the voyeur's sudden experiential transformation upon realizing that he has been caught. Upon this stable relation to the hallway, and in this particular configuration which includes another person who has just caught our voyeur in the act, Sartre describes a new organization of experience. It is no longer one of immersion. In this moment, caught in the act, the voyeur's field of awareness now includes an explicit awareness of himself, there crouched incriminatingly in the hallway. Upon being caught, a central anchor of the voyeur's awareness is the place of himself in the view of the other.

Coshapings

Postphenomenology conceives of the objects of the world in terms of a relational ontology. Humans and technologies and the world are not assumed to be distinct and independent entities, but are found to be essentially related to one another, their separations only ever local and dependent on context. As Ihde puts it:

> This style of ontology carries with it a number of implications, including the one that there is a coconstitution of humans and their technologies. Technologies transform our experience of the world and our perceptions and interpretations of our world, and we in turn become transformed in the process. Transformations are non-neutral. (2009, 44)

Peter-Paul Verbeek expands on this line of thinking, developing a language of "coshaping" in which technological mediation should be conceived as the manners in which humans and their world are mutually coconstitutive. He writes that

> human-world relationships should not be seen as relations between preexisting subjects who perceive and act upon preexisting worlds of objects, but rather as sites where both the objectivity of the world and the subjectivity of those who are experiencing it and exiting in it are constituted. (Verbeek, 2011, 14)

Verbeek follows out this relational understanding of ontology to argue that when we are thinking about ethics, it is crucial to consider how the ethical situation at hand—the problem context, the units of analysis, the roles of the various players, and so on—has been coshaped by technological mediation, a claim that can be extended to political analysis as well.

My suggestion is that when analyzing technological multistability, it is important to contrast the different stable coshapings of subjects and objects.

Postphenomenology's commitment to a relational ontology is of course shared by a number of related perspectives, including the feminist new

materialism of Donna Haraway, Karen Barad, and others, Andrew Feenberg's conception of technological "ambivalence," Jane Bennet's "assemblage" theory, and, in certain ways, classical phenomenological and American pragmatist perspectives (e.g., Haraway, 1997; Barad, 2007; Feenberg, 1999; Bennett, 2010). For example, following Martin Heidegger, we should consider the presence of things not only as distinct and autonomous objects, but as existing within a context of assignments. As Søren Riis summarizes Heidegger, "all beings are thought of as a type of 'indicating-equipment' because they are always involved in a referential framework with something else" (2018, 47). In my own work thus far, I've drawn on another related perspective which shares a relational ontology: actor-network theory (ANT), and especially the 1990s version of it focused on everyday technologies developed by Bruno Latour and Madeleine Akrich (e.g., Akrich, 1992; Latour, 1999). I have suggested that one important aspect of a technology's various stabilities that is subject to cross-analysis is its place in a network of actors (e.g., Rosenberger, 2014, 2017a,b).

For example, when the keyhole is used as part of the process of unlocking a door, it sits within a different network of actors (and, phenomenologically, indicates a different framework of assignments) than it does when it is used as a peephole. The keyhole, when used for unlocking the door, calls forth a network that includes the key, the keyring, the bolt lock, the doorbell, the welcome mat, and such. The keyhole-as-peephole stability, in contrast, affords a view to the other side, surreptitiously enrolling the room beyond into the network of the voyeur's surveillance. If we shift our investigative pivot to the hallway, we can contrast both of these with the keyhole's place in the experience of this larger context. In the moment the voyeur is caught, and his experience is reanchored in the hallway, and the keyhole is no longer a transparent conduit of experience, but becomes an object in the background of this new context of assignments.

This extends to the concrete physical differences that can occur between stabilities. Following Akrich, we can consider how actors are changed in the process of enlisting them into the agenda of a particular network. I've come to refer to these changes as "material tailorings" (e.g., Rosenberger, 2014). For example, we can imagine that Sartre's voyeur might want to somehow alter the keyhole if possible so as to see more of the room. Or we can imagine that after the voyeur has been caught, the occupant of the room might decide to change out the lock, and install one that does not afford peeping. These kinds of material alterations to technology are difficult ones to capture with only the tools of postphenomenology because they involve actions between people, and sometimes extended groups of people and things. So it can be helpful to combine our postphenomenological insights with social science and theory.

Politics and the Look

Without going into the specifics of Sartre's particular ontology, the example of the caught-in-the-act keyhole voyeur evocatively draws out an important insight: who we are, and how we experience ourselves, is shaped in part by how others perceive us, and thus also by the means by which we can be observed. The topic of the experience of the Other, as well as the experience of existing with others, is an important theme throughout classical phenomenology and through contemporary feminist and race theory. But it has been less deeply thematized in postphenomenology. The example of Sartre's voyeur helps to show why this is an important issue for postphenomenological work to tackle more explicitly going forward.

Sartre writes: "The Other's look confers spatiality upon me" (1943, 357). That is, in Sartre's account, the experience of being seen by another person brings to presence our own status as a physical body in the world. "Therefore," as Nicola Liberati and Shoji Nagataki put it, "the presence of the other has the power to change the perspective of the subject" (2019, 339). Norm Friesen and colleagues spell out this changed perspective:

> Lived space suddenly becomes the space of the hallway rather than the space of the other side of the keyhole. Lived relation is now largely determined by the objectifying gaze of the second observer. The lived body now becomes an object of acute awareness, and lived time is defined by an anticipation of the response of the other. (2009, 86)

This basic insight is an important part of accounts of everything from the nature of consciousness, to the politics of surveillance technologies, to the structure of the objectification of women, to observations about who in our society can go about their day in most moments largely and blissfully unaware of the specifics of their own bodies—and who cannot.

This phenomenological insight also bears specifically on the nature of human–technology relations. As Sartre explains,

> The look does not carve me out in the universe; it comes to search for me at the heart of my situation and grasps me only in irresolvable relations with instruments. If I am seated, I must be seen as 'seated-on-a-chair,' if I am grasped as bent over, it is as 'bent-over-the-keyhole,' etc. (1943, 353)

Sartre's reflections on the nature of 'the look' of the Other draw out an essential *general point* about human relations to technology: technological mediation is not merely a transformative relationship between a user and a device and the world; it is also essentially intervolved with other people.

Human–technology relations do not reduce to only that human–technology–world triad. In the dramatic and yet simple example that Sartre provides, we see the voyeur's relations to technology, to the surrounding world, and to himself all change through the action of another person. Sartre's reflections also draw out a *specific point* on this issue: how we are seen by others is a crucial element to human–technology relations. Our arrangements with our immediate devices and surrounding architecture, and how they mediate our experience, is determined in part by our place under the view of other people and the technologies through which they perceive us.

This first general point—that other people are deeply involved in any human–technology relation—is a fact which draws out the inextricably social and political nature of any investigation of technology usage. While postphenomenology specializes in the examination of individual human–technology relations, contemporary postphenomenological work has also often reached out for connections to social and political theory, especially feminist epistemology, critical theory, and accounts of technology coming out of the field of STS.[5] The work of other people at other times—say, designing the object we are about to use, or constructing the space we are about to inhabit—influences our own human–technology relationships. Insofar as our world and as we ourselves are coshaped by technological mediation, the work of other people in the construction of our devices and spaces is active part of that coshaping.

This second and more specific point—that our place in the look of the other is deeply involved in human–technology relations—is also an inextricably social and political element that must be addressed by any account of technology. As a theory of human–technology relations, postphenomenology has some room to better develop its account of the technological mediation that occurs between users, say, in the experience of communication through our devices. But even more, this perspective should work to better explain how the phenomenology of the look shapes the politics of human–technology relationships. How does our technological situation enable others to see us in specific ways, and how do those technologically mediated gazes of other people shape who we are?

That is, exactly who sees whom and how, and exactly how that seeing is technologically mediated, has implications for the nature of technology usage, architecture, surveillance, and public space.

HOSTILE OBJECTS AND SPACES

A conversation is emerging across both academic research and popular discussion (including journalism, blogging, and social media) over the ways the objects of public spaces are designed to target and exclude vulnerable

populations. On the one hand, this discussion builds on a history of work in radical geography, urban revanchism, spatial justice, and critical urban theory (e.g., Foucault, 1977; Davis, 1990; Flusty, 1994; Smith, 1996; Low, 2003; Mitchell, 2014). But, on the other, the discussion over hostile design can be simultaneously understood as nascent and disparate, with individual researchers writing somewhat independently across a variety of fields, including criminology, urban studies, art, law, and philosophy (e.g., Savicic & Savic, 2013; Quinn, 2014; Schindler, 2015; Chellew, 2016; Petty, 2016; Rosenberger, 2017a, 2020b; Jensen, 2018; Smith & Walters, 2018). The terminology even remains entirely unresolved, with some referring to these phenomena as "hostile architecture," "architectural exclusion," "disciplinary architecture," "interdictory space," and "defensive architecture," among other terms. I'll refer to these phenomena here as "hostile design" (Rosenberger, 2020b).

Hostile designs of course come in any number of forms. But some of the most widely recognized ones include spikes set into ledges and other surfaces to deter people from sitting there. Another example are seat dividers, and armrests, and other design configurations that make it difficult to use a bench as a place to sleep. There are also hostile interventions into the soundscape, such as loud sound systems that deter camping in parks. And there are trash-can designs that deter picking. It is also possible to interpret the removal of expected amenities as a form of hostile design. For example, things that the unhoused might use, like those benches for sleeping, or public restrooms, are simply eliminated from a space. As you can see, the homeless population—that is, those living unhoused—are one of the primary groups targeted by hostile design (Rosenberger, 2017a).

But they are not the only one. Loitering youths and skateboarders are also frequently targeted. Skatestoppers—those small metal nubs affixed to ledges and handrails to deter skateboarding grinding tricks—are not uncommon (Rosenberger, 2018). To deter loiterers, sound systems sometimes play music that younger people do not prefer. Some antiloitering sound devices even emit noises at frequencies that only the young can hear. I've also suggested that fire hydrant locks are an example of hostile design (Rosenberger, 2017b). Poor neighborhoods are less likely to have access to things like air conditioning and public pools, and sometimes people open fire hydrants as a form of relief from the heat. In response, sometimes locks are added to the hydrants, with a variety of locking options available.

Another example of a public space technology that is routinely included in reviews of hostile design is security cameras. Let's set this example to the side for the moment, and return to it in detail in the next section. The hostility of security cameras functions in some ways differently from the examples listed above.

Theories of Hostile Design

While it would be impossible to provide any kind of full account of hostile design here, whatever that might mean, several things must be noted about these public space design strategies. For one, an individual instance of hostile design must be understood, at least in part, in terms of its place in a larger context of law, design, and convention across the city. This context includes the structures and patterns of power, such as the attitudes of influential social groups like tourists and the business community, the patterns of design across the city that work together to target particular groups, and the patterns and policies regarding the privatization of space. Hostile design strategies often work in conjunction with laws that target the same groups. For example, hydrant locks often function in concert with laws against unauthorized hydrant access. Skateboarding may be outlawed in areas also set with skate-stoppers. Antihomeless design is just one small part of many cities' hostile approach toward the unhoused. Laws against everything from camping, panhandling, and sleeping in a car, to those against loitering, vagrancy, or sitting and sleeping in public ("sit/lie" laws, as they are sometimes called) all have the effect of criminalizing almost every aspect of unhoused people's lives.[6]

There are of course also perceptual, epistemological, and value dimensions to hostile design. The label of something as an instance of "hostile" design is an evaluation, and one made from a particular situated perspective as an act of criticism; it is not simply an objective description of the state of the world. It is the claim that a design targets a particular population in a way that should be regarded as condemnable, or that it should at least be eyed with suspicion. I want to resist here any intuition that a nonevaluative terminology would be preferable, or that it should even be understood as straightforwardly possible. In this way, I also want to resist even a stance that assumes that all public space technologies should always be open to as many uses as possible. This is because there are restrictions on the use of the public space, enforced though design, that we may want to defend (Rosenberger, 2017a, chap. 7). For example, many public space objects include design features that restrict certain usages for the sake of protecting people from harm (e.g., from themselves in the case of suicide barriers on bridges, or from others in the case of heavy roadside bollards that block terrorists from ramming buildings with a car). We're stuck with our evaluative and situated perspective, and we should own it.

This plays out in what we can know and perceive about hostile design. It is possible that, in many cases, people who are not targeted by such designs will not even notice instances of hostile design in public space. Indeed in many (though, as we will see, not all) cases, hostile designs are created specifically to remain unnoticeable to the nontargeted. If hostile designs do not

disrupt the everyday happenings of a person's lifeworld, then those designs may not stand out as significant things. In contrast, for those targeted by hostile design, those same objects may stand forward as points of concern. The project of bringing together those perspectives, and educating the dominant ones about the concerns of the marginalized, brings us into the purview of political epistemology.

And, lastly, any account of hostile design should be able to accommodate the possibility of resistance (a topic I'll elaborate upon further in the next subsection). That is, the targeted community may develop ways to actively counter or sidestep hostilities imposed upon them. For example, skateboarders sometimes physically uproot skatestoppers with crowbars or power tools. People find ways to hack into the hydrant locks. And design work can be done to create devices that counteract hostile agendas. Artists and activists may attempt to call attention to the hostility built into public space architecture.

Multistability and Hostility

I've argued that a productive way to approach the theorization of hostile design is in terms of the postphenomenological notion of multistability (e.g., Rosenberger, 2014, 2017a,b). We can consider the objects of public space to be multistable technologies, playing potentially different roles for different users of these spaces. We can then conceive of hostile design as a material modification of such a device—a concrete tailoring, as we called it above—that "closes off" one of those stabilities, and is, in particular, a closure that deters a usage preferred by a vulnerable population (Rosenberger, 2017a).

For example, we can think about a trashcan as a multistable device with a can-as-receptacle stability. This would be what Ihde would call the trashcan's "dominant" stability, the one for which the device was designed and made, and the one for which it appears to be primarily used. But we see that others are also possible, such as what we could call a can-as-resource stability, one in which the trashcan is approached as a place to obtain something. Sometimes the poor or unhoused approach such garbage cans as potential sources of recyclable materials that can be traded in for small sums of money, or as possible sources of discarded food. Then, as noted above, we can identify a form of hostile design, an antipick design, that is, trashcans designed in such a way that they deter picking. Antipick designs include things like rain hoods and other design modifications that function to limit one's ability to reach inside. Sometimes these are combined with locking mechanisms affixed to the can to further ensure the garbage can's contents cannot be accessed in an unauthorized manner. These design features can be understood to close off the can-as-resource stability.

Across the various examples of hostile design, it is possible to observe patterns in the way their hostility is enacted, what we could call the different "logics" of hostility. The most common logic we can see at work across these entries is one we could simply call *physical imposition*. Under a logic of physical imposition, the particular materiality of an instance of hostile design gets in the way of a bodily relation one might otherwise take up with the device. The hostile design functions to close off a particular stability by obstructing it in some way. The bench armrest poses a physical imposition to lying down across the device. Spikes built into a ledge stand in the way of someone who would like to sit there.[7]

Contrast these examples that operate through a logic of physical imposition with, for example, the sound systems that broadcast unfashionable music to deter the presence of loitering teens, or that blare irritating high-pitched noises to target that same group. The hostility of these examples functions differently from those above. We could say that these instead function under a logic of *sensory imposition*. Rather than physically obstruct a particular stability, they pose a kind of impediment to a particular sensory relation. In these cases, they make it so annoying to be in the presence of these particular sounds that a targeted population would be deterred from using the space at all.

In the next section, we'll consider further hostile logics in addition to those of physical and sensory imposition.

Let's also return to the issue of resistance to hostile design. Resourceful people among the targeted, as well as activists and artists, engage in strategic redesigns of their own. If there is a multitude of examples of hostile designs that "close off" stabilities of objects and spaces, then there are also many examples of efforts at material tailoring that work to "reopen" them. As mentioned above, targeted groups and their allies respond in many ways. Skateboarders engage in vandalism against the skatestoppers, popping them off one by one. Homelessness advocacy groups attempt to raise awareness of antihomeless agendas, putting a spotlight on antihomeless designs through artworks and consciousness-raising efforts. And public spaces are sometimes even designed with skateboarding in mind. There are garbage can designs that encourage recyclable objects to be picked. There are even "spray cap" programs that encourage communities to use hydrants as community sprinklers.

A Pivot to Hostile Spaces

Recall that it is important to be mindful of the pivot points of our analysis here. In the discussion above, the targets of investigation—the pivot objects under analysis *as* multistable—have been a single technology, for example, a hydrant or a bench. However, we could attempt to take up many other

potential vantage points. For example, following our analysis of Sartre's story of the voyeur, we could draw back from a focus on a central multistable object (the keyhole), and consider the multistability of the surrounding area (the hallway). In the case of hostile design, we can correspondingly pull back and consider the multistability of our architectural surroundings, the built environment, and public space. We can consider hostility in terms of an axis of space, rather than an axis of individual objects.

For example, we can cross-examine the various stable uses of public spaces that can be seen in practice. In contrast to a traditional and dominant usage of public space, we can see many other ways that such spaces can be inhabited. Youths and others make use of public spaces as a place to loiter. Skateboarding culture at times involves the creative appropriation of public spaces, continually searching for new ways to interact with objects and areas with skateboards, rollerblades, and bicycles. The unhoused take up public spaces as a place to live; the city itself becomes home.

In this way, we can think about hostile design not only in terms of hostile objects, but also in terms of hostile spaces.[8] In the case of an investigation of hostile design that pivots upon an individual object, we can see certain targeted stabilities of that object to be closed off by design modifications, such as the armrests added to the bench. In such a case, the hostile design closes off a particular stable relationship with a particular device. In contrast, in the case of an investigation of hostile design that pivots upon a particular space, we can see certain targeted stabilities of that space to be closed off through design modifications made to the architecture and the objects of that space. For example, an effort to close off an area that might otherwise be used by the unhoused as a place to rest might include many things: the benches might be remade as antisleep benches, the trashcans might be remade into antipick cans, certain locations might be fenced off, and any number of further anti-homeless measures could be enacted. Of course such design choices could work in tandem with legal efforts also imposed upon that space, say, the outlawing sleeping on those benches, or the outlaw of loitering. The hostile design in this case closes off a particular stable way a particular space can be inhabited.

Also, in examples we have seen above and in some we will discuss below, certain hostile logics themselves appear to operate upon an axis of space rather than one of individual objects. This was the case for the particular examples of sensory imposition reviewed above. The irritating sounds emitted by noise makers that are intended to deter the presence of loitering youths are an example of hostile design that enacts its hostility at the level of a particular area, not merely a particular object. Like the way a shift in pivot was required in the move from thinking about the multistability of the keyhole to that of the hallway, an analogous move is required to shift from thinking

about the physical imposition of something like the antisleep bench or anti-homeless spikes to the sensory imposition of the irritating sound system. If one stability of public space is its affordance of loitering to youths, then the irritating sound system works to close off this stability of that space.

While this theoretical framework for understanding hostile design might fit well with some of the examples reviewed so far, we will find that when applied to the example of security cameras this account buckles in revealing ways.

CAN SECURITY CAMERAS BE HOSTILE?

To clear out an encampment of unhoused people living outside the building of the San Francisco SPCA (an animal adoption nonprofit), the management brought in a talking robot (Robinson, 2017; McCormick, 2017). Shaped like a human-sized egg on wheels, the robot pestered unhoused people camping on the sidewalk, reminding them that their presence violates the rules. Crucially, the robot was also equipped with a series of cameras and sensors. They enable human security personnel to see from the robot's perspective and gather an assortment of data, which the robot's developers claim provides "superhuman" perception. And the autonomous robot's mere presence—a quite conspicuous presence—makes clear to those in its route that they are being watched.

The story doesn't end there. While what some referred to as the "antihomeless robot" was successful in warding off unhoused campers, it also incited resistance. The robot was vandalized, for example, finding itself draped with a tarp, sprayed with barbeque sauce, and pushed over. And as the story went viral, online outrage ensued, the city ordered that the robot be kept off public property, and the SPCA ultimately ceased use of the device.

In the case of the antihomeless robot, we see an extreme example of a pervasive urban phenomenon: camera surveillance. This topic thus brings us into the realm of not only the history of urban criticism, but also the bustling field of surveillance studies (e.g., Foucault, 1977; Norris and Armstrong, 1999; Lyon, 2001; Levin et al., 2002; Goold, 2004; Friesen et al., 2009; Monahan, 2010; von Silva-Tarouca Larsen, 2011; Ball et al., 2012; Marx, 2015b). All variety of surveillance practices, from internet data collection to shop-floor monitoring, come under study. Gary T. Marx summarizes the instrumentalist perspective popular in at least some of this literature, "Surveillance as such is neither good nor bad, but context and comportment make it so" (2015a, 733).

Perhaps. But in any case, this chapter is concerned not with surveillance in general, but with the use of public space cameras, also sometimes called

CCTV, or closed-circuit television (e.g., figures 4.1 and 4.2). As noted above, in reviews of hostile design, security cameras are routinely listed as a main example, reviewed right alongside the antihomeless spikes and antisleep bench. Not all security cameras are automatically examples of hostile design. But they can certainly become instances of hostile design as they are enrolled into hostile agendas, used as part of efforts to target vulnerable groups and control their relationship to public space.

It is true that usage of security cameras does not always reduce to one specific hostile agenda targeting a particular group. For example, they may be used for crime deterrence, as well as in gathering footage used for solving crimes. But the effectiveness of public space cameras for the former remains an open question. As Beatrice von Silva-Tarouca Larsen puts it, "The belief that CCTV surveillance markedly increases our security in public has yet to be confirmed . . . The public interest in CCTV is thus far less compelling than usually portrayed" (2011, 185–86).

Things get more complicated (and the theoretical tools offered here buckle further) when we consider that security cameras themselves are only one object within larger surveillance systems. And security cameras are

Figure 4.1 Two Public Space Security Cameras, London, England. *Source*: Photo taken by author.

Figure 4.2 Security Camera Under Dome Cover, Beltline Park, Atlanta, USA. *Source*: Photo taken by author.

themselves objects made up of other objects. So there are multiple layers to the mediation of surveillance, and this is true as well as for hostile surveillance. The choice of investigative pivot is noninnocent.

Things become even more complicated still, and more relevant, when we additionally consider contemporary issues of computerized surveillance. For example, facial recognition algorithms bring further power to the security apparatus and further reason for those under surveillance to be mindful of their own behaviors. As security cameras gather and store more and more digital information, this information is open to analysis under big data techniques. These contemporary forms of computerized surveillance—facial recognition technologies and big data analytics, just to name the big ones—have of course been shown to perpetuate damaging prejudices. These built-in discriminations, set within algorithms, can potentially contribute to hostile agendas.

Confederacy and Self-Coercion

In the previous section, I suggested that most examples of hostile design, from antihomeless spikes to antisleep benches, operate on a logic of physical imposition. They obstruct particular stabilities, targeting vulnerable populations for exclusion. I also identified another logic which can be seen in some examples of hostile design, such as those that alter the soundscape, which operate through a kind of sensory imposition. But security cameras, when serving as part of a hostile agenda, stand out as both a main example of hostile design and also an odd one. Security cameras do not physically or sensorially "get in the way" of any particular actions. These devices operate through different forms of hostile logic.[9]

I suggest that security cameras can be conceived as operating under two different hostile logics (sometimes, but not always, simultaneously): what we can call "confederacy" and "self-coercion."

Under a logic of *confederacy*, a device enacts hostility as a tool of human users who are taking part in a hostile agenda. In such an instance, the device acts as a confederate, working together with human actors to close off a particular stability of the surrounding space. For example, a sign-in desk which sits at an entryway to a public space can have the effect of deterring certain populations from entering the space. If the human security guards who sit at the desk were to conduct their work in a hostile manner, and keep particular targeted populations from entering, then the desk could serve as a tool that assists in this agenda. It provides a checkpoint where the security guard could work to dissuade members of the targeted group from passing through.

Security cameras are a prime example of a device which can serve as a technological confederate to human actors who are enacting a hostile agenda. A security camera can be used to extend and otherwise transform a security personnel's perceptual abilities to observe a space. Like Sartre's keyhole, the camera provides a surreptitious view of the surveilled. If the camera is a hidden one, then, like those beyond the keyhole, the people under surveillance will remain unaware that they are being watched.

Many other experiential transformations are enacted by the camera. The camera provides temporal transformations to the security guard's vision, enabling views of the past through recoded video footage, which could also be slowed down or speeded up. There are spatial transformations as well, with a security camera perhaps providing a wide angle, or the possibility of zooming in on an area. A security system may offer a bank of feeds to a single security officer who watches multiple areas at the same time, perhaps on multiple screens. The embodied and hermeneutic transformations enabled by surveillance devices are an open area for postphenomenological research.

We can also consider examples of hostile design that operate by a different logic entirely. Rather than force the closure of a stability through a kind of imposition from the outside (be it through the imposition of the design itself, or through its confederacy with human actors), hostile designs sometimes influence the targeted population to themselves opt to not use space in a particular way (or to opt to simply not use the space at all). Such instances of hostile design work to somehow remind the targeted population that they are being targeted, that their behaviors will not be tolerated by the authorities, and that they are under scrutiny. In this way, such instances of hostile design encourage targeted people to enact the hostility upon themselves. Let's refer to this as a logic of *self-coercion*.

The most straightforward example is signage (e.g., figure 4.3). Conspicuously posted signs that display a rule, or a list of rules, do more than merely provide information to the reader. Posted signage constitutes a normative claim. It tells you what to do. It issues a warning. As noted in the previous section, individual instances of hostile design are often players in larger hostile agendas that may include human actors, patterns of design, as well as laws and policies and rules, among other things. Signage makes those invisible laws or rules visible and material.

Figure 4.3 Row of Antiloitering Signs, Atlanta, USA. *Source*: Photo taken by author.

For example, the unhoused are targets of a panoply of laws that make many of the basic behaviors of their lives illegal. So, a sign that displays a reminder of a local antiloitering law can be itself a hostile object; it sends a message to the unhoused that they should move along. The sign enacts its hostility not by reaching forward and physically obstructing a particular usage of a space. It incites readers to take it upon themselves to follow the rules. The hostility of signage operates via a logic of self-coercion.

This brings us back to public space security cameras. The very presence of security cameras in public spaces can have a hostile effect. This is because the visible presence of a security camera itself serves as a reminder that you are being watched, and thus that you should be following the rules. This visible presence of the security camera, and the prospect of being at that moment under surveillance by authorities, encourages you to police yourself. In this way, security cameras, insofar as they function as part of a larger hostile agenda, are a paradigmatic example of hostile design that operates through a logic of self-coercion.

The security camera, operating under a hostile logic of self-coercion, again resonates with Sartre's example of the voyeur. The security camera hanging conspicuously from the ceiling functions like the third person coming down the hall. It catches one in the act, and in the process changes one's relationship to oneself. The experience of being noticeably surveilled increases people's awareness of themselves, and this explicit self-awareness occurs in the terms of that surveillance. The security camera puts us in the position of the caught-in-the-act voyeur.

The self-coercive hostility of the conspicuous public space security camera appears to pivot upon an axis of space. That is, insofar as a space can be conceived as multistable, and is open to different meanings and uses taken up by different people, then the presence of the camera can work to close off certain stabilities of that space. The visibly present camera, through a hostile logic of self-coercion, incites different people in different specific ways to become explicitly aware of themselves. For a member of a targeted population, one for whom the local rules and norms and social pressures are directed against their spending time in the space, the camera serves as a reminder of these rules and norms and social pressures. The camera—insofar as it's not hidden—works toward closing down a stability of the space this targeted person might prefer by encouraging them to refrain from engaging in this stability. The hostility of the security camera is not closing down a particular usage of the camera itself, as does, say, a hostile design modification made to an individual bench; the camera closes off a stability of the surrounding space.

It is crucial to consider the role of the camera's very materiality. And to do this, we should take a tangent into the work of Michel Foucault (1977). Foucault, much more than Sartre, is a touchstone for work in surveillance

studies. And it is in Foucault that we see surveillance addressed not only as the look of another person, but also as a technological artifact. It is not my goal here to attend too deeply to Foucault's account of the automatic functioning of power, as that is a topic well covered in both the fields of surveillance studies and the philosophy of technology. But it is important to address the camera itself in its material specificity, a physical device in public space. It is the camera's visibility as a physical thing that itself enables it to take on a hostile logic of self-coercion. As Foucault describes, one aspect of the nature of surveillance is that it be both at the same time "visible" and "unverifiable." The surveilled must "never know whether he is being looked at at any one moment; but he must be sure that he may always be so" (Foucault, 1977, 201). The black lens of the camera not only functions as a form of surveillance, but it serves as a symbol; it communicates that a human being may be on the other end giving watch. A security camera does not even require a human operator to be watching from the other end at all times in order for this hostile function to be performed. (And, in fact, it is possible to purchase fake security cameras, devices that look like a typical camera but do not perform any surveillance or recording.) The lens by itself issues the threat.

This point is made explicit by the example of security cameras set underneath dark domes that obscure the direction they are pointing (e.g., figure 4.2). In such cases, the device is visibly present *as* a security camera, and yet its configuration makes it difficult or impossible to know where exactly the lens of the camera is directed at a given moment. Thus any person nearby the domed camera is left to assume that at any moment they could be under surveillance. The camera *might* be pointed in any direction, so one is left to behave as if it *is* pointed at them. (And like Foucault's guard tower that may at a given moment not even have a guard posted, we can imagine a black dome with no camera inside.) A similar observation can be made about signage that conveys that an area is under surveillance. Signage about surveillance is a physical object, one that incites readers to police themselves as if they are under the gaze of a camera, but without even requiring a visible camera (or, indeed, any camera) to be present.

This raises a final point about the conspicuousness of security cameras. When functioning as part of a hostile agenda, the level of conspicuousness required for the camera itself differs for the different hostile logics at issue. Under a logic of confederacy, it can be an advantage for the device itself to be inconspicuous, even hidden. As noted above, a hidden camera can be of assistance to a human security officer who is attempting to surreptitiously surveil a space. In contrast, under a logic of self-coercion, it is important for the surveillance equipment to be as conspicuous as possible. For the surveilled to be encouraged to police themselves, they need to see evidence that they are under surveillance.

Camera Resistance

Londoners woke up one morning in 2008 to find a surprise new mural adorning the side of a postal building courtesy of notorious graffiti artist Banksy. Multiple stories tall, the mural contained the words "ONE NATION UNDER CCTV" in enormous letters, and it was located directly beside a bank of real security cameras. The mural included an image of a child on a ladder holding a long roller as if she had painted the words. It also included the image of a police officer watching her from below. Created without a permit, the work of art was considered vandalism by the city council and was painted over (BBC News, 2008).

Like this Banksy stunt, many activist artworks serve to call attention to the surveillance infrastructure all around us. For example, media theorist Thomas Y. Levin reflects on the works of artist Denis Beaubois which fit this trend (Levin et al., 2002, chap. 8; Levin, 2007; see also denisbeaubois.com). Beaubois has engaged in multiple projects that raise awareness of the surveillance systems that populate public spaces, for example, by planting himself in the middle of a space and patiently staring down a security camera, an act which sometimes has the effect of drawing the attention of passersby to the cameras, and sometimes ends with authorities forcing him to leave the area for "disturbing the peace" or "protesting without a permit." As Levin explains, Beaubois's stare has two audiences, a primary audience of the camera itself, and a secondary audience of those people in the space who are also under surveillance. On this secondary audience Levin writes, "Perplexed by the inscrutability of Beaubois's encounter with his 'primary' audience, they suddenly become aware not only of the presence of the (previously unseen even if not hidden) camera but also, possibly, the 'other actor' in this collaborative performance, i.e. the surveillance agency exposed by the readable dynamic between the frozen Beaubois and the seemingly 'active' observation apparatus" (2007, 86–87). In cases in which Beaubois is made to leave the premises, these otherwise unseen rules are also exposed. His requests for the footage of these acts further reveal the recording apparatus at work.

Or take the work of Sandjar Kozubaev. He engages in speculative storytelling about what it would be like to live in a future world in which privacy rights have been almost entirely curtailed (Kozubaev, 2016). A symbol called a "No Nigma" emerges as an important element of this story, and this project includes an interactive design element in which real signs are placed around the city, and participants find them and post images of their discoveries on social media (e.g., figure 4.4).

Participants are additionally invited to advance the story themselves, further speculating on the future relations to space and privacy.

Figure 4.4 A "No Nigma." *Source*: Photo by Sandjar Kozubaev.

If security cameras can be conceived as multistable technologies, then we can understand them to be open to fitting into different contexts of meaning. For the dominant population of public space users not targeted by hostile design strategies, the default stable relation to the cameras is one in which they withdraw into the background of the space, sitting back largely unnoticed. Their role in hostile strategies targeting specific minority populations may thus also often go unnoticed by this dominant population. And too—although not the focus of this chapter—their role in having controlling effects on that dominant population (say, in terms of a reduction in privacy) may similarly go unnoticed. Or as Benjamin Goold and his colleagues put it, "the spread of CCTV suggests that the myopic and colonizing properties of security can also assert themselves when people stop talking about crime-control practices and technologies, when they cease to notice or pay attention" (2013, 988).

The kind of activist art and design projects reviewed above can thus be understood as provoking an alternative stability to the general population's relationship to security cameras specifically, and to public space more generally. A consciousness-raising work may prompt the dominant stability (in which cameras are experienced as an unnoticed and innocuous background

feature) to become at least temporarily superseded by one in which the cameras are experienced as active objects connected to a network of powerful actors. The very materiality of surveillance makes this shift in stable perception possible. Like the way that the keyhole requires a specific bodily comportment to be used as a peephole (a comportment that leaves Sartre's voyeur open to the possibility of being caught in the act), the material situation of public space cameras at times leaves them open to exposure, critique, and resistance.

It is an open question whether any particular consciousness-raising effort can be effective in changing people's views on surveillance technologies. There is even the potential for such efforts to backfire. As Torin Monahan notes, "while the oppositional framing presented by activists (that is, countersurveillance versus surveillance) may challenge the status quo and raise public awareness, it also introduces the danger of unintentionally reinforcing the systems of social control that activists seek to undermine" (2010, 130). And I'll note too that while this may be the case for criticism of surveillance in particular, it is also a potential problem for criticism of hostile design in general. As criminologist James Petty has pointed out, the backlash that has arisen over some egregious and highly visible antihomeless designs like antihomeless spikes may not reflect the public's genuine support for the unhoused, but actually instead their distaste at being reminded about the problem of homelessness altogether (Petty, 2016). A challenge for those of us working to criticize hostile design is to develop resistance strategies that marshal support for those under discrimination.

CONCLUSIONS

There is yet another metaphor to be made to Sartre's voyeur. When the voyeur is immersed in the act of spying through the door, he has grown correspondingly less aware of the happenings of his own immediate surroundings. This scenario is in some ways similar to that of a person moving through public space if that person is not among those targeted by hostile design. We can ask: what goes unnoticed by those using public space in a normal and everyday manner, especially if they are using that space in a way not targeted by any kind of hostile agenda? What kind of organization of awareness, in general, accompanies the dominant usage of public space? Like Sartre's voyeur immersed deeply in the act of voyeurism, as we ourselves go about immersed in the everyday lifeworld of the dominant usage of public space, we may come to fail to perceive the politics of its background materiality.

As I've worked on the topic of hostile design, I've been struck by how often readers report that ever since examples of hostile design have been

pointed out to them, they now seem to see them everywhere. As members of the dominant user group for public spaces, broadly put, they had not been targeted by instances of hostile design, and, correspondingly, had not noticed them. These aspects of their surroundings sat unnoticed. But now, armed now with at least a small awareness of some of these examples, they can't help but take notice.

Part of the phenomenology of architecture is the work of undoing the automatic and habitual relationships we have to spaces, and revealing elements that are present but less reflected upon. Hostile design is one of these elements. With a step back, and an openness to the perspectives of marginalized people and others, we can begin to see and theorize the agendas built into the mortar and glass of public spaces. What is revealed, to different degrees in different cities in different ways, are interconnected networks of confederates, impositions, and inciters of self-coercion. A greater vigilance, and a greater theoretical and empirical rigor as well, is becoming necessary as these technologies of discrimination become more sophisticated and more pervasive.

NOTES

1. One defining feature of postphenomenology is its combination of insights and commitments from classical phenomenology and American pragmatist philosophy (see, e.g., Ihde, 2009, 2016; Rosenberger, 2017d).

2. Whyte's research is part of a contemporary trend of thought within postphenomenology which focuses on methodology (e.g., Rosenberger, 2014, 2017d; Whyte, 2015; Aagaard, 2017; Aagaard et al., 2018; Hauser et al., 2018).

3. Ihde's work of course influentially differentiates between "embodiment relations," reviewed here, "hermeneutic relations," which involve a reading and interpretive relationship with technology, "alterity relations," in which the device itself takes on a quasi-significant presence, and "background relations," to be reviewed below (e.g., Ihde, 2009, 42). Peter-Paul Verbeek has expanded on these, suggesting that we should also consider cyborg relations that extend into our bodies, or that expand out into "smart" interactive environments (2011). And recently, Inger Berling Hyams and Galit Wellner have even explored the possibility of a separate writing relation (Hyams, 2017; Wellner, 2017).

4. Of course Ihde's account of "embodiment relations" and "transparency" lifts deeply from the work of classical phenomenologists, especially Martin Heidegger and Maurice Merleau-Ponty, repackaging their insights for the purpose of studying human–technology relations (Heidegger, 1996; Merleau-Ponty, 1945)

5. In particular, there are multiple lines of inquiry into how ANT and postphenomenology may be productively incorporated (e.g., Verbeek, 2011; Rosenberger, 2014, 2017b; de Boer & Slatman, 2018).

6. Some examples of analyses of laws targeting the homeless include (Mitchell, 1998a,b; National Law Center for Homeless and Poverty, 2014; Rosenberger, 2017a, chap. 4).

7. Although I will not get into it in this chapter, another logic of hostility that must be noted here is one in which a public space object is simply removed entirely. Or an expected amenity may simply not be found. For example, rather than discourage sleeping on a bench by adding armrests or seat dividers, the bench could be removed entirely. I refer to this kind of hostility as operative by a logic of *absence*. We can also imagine public space amenities that are not entirely removed, but are instead made difficult to find, say a restroom that is by law available to the public, but that the public would never see because it's set back in a long unmarked hallway off a lobby. The hostility of such a design choice could be understood to operate via a logic of *concealment*.

8. In considering the possibility that "spaces" could be hostile, we can join with others whose theorizing on the exclusionary practices of cities has tended to be couched at this level, such as Flusty's conception of "interdictory spaces," or Németh's analysis of the "components" of bonus space management (Flusty, 1994; Németh, 2008).

9. This chapter builds on ideas first developed in a sister paper to this one, written for the forthcoming book *Relating to Things: Design, Technology and the Artifactual*, edited by Heather Wiltse (Rosenberger, 2020a).

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Chapter 5

Nonplaces in the Postphenomenological Perspective

The Intersection of Disembodiment, Nonalterity, and the Hermeneutics of Exclusion

Natalia Juchniewicz

INTRODUCTION

When talking about nonplaces, we usually think about spaces that are shared with other people in the public sphere, which are open for everybody and fulfill various practical goals that make such places similar to one another. Among nonplaces, we have such architectural objects as shopping centers, railway stations, bus stops, airports, parks, but also structures such as bridges, roads, streets, or benches. Architects and philosophers have made numerous attempts at understanding the meaning of places and nonplaces in the modern (or postmodern/supermodern) society; however, their perspective has usually been phenomenological (Holl 1996; Moran 2000; Norberg-Schulz 2000; Sandin 2003; Pallasmaa et al. 2005; Shirazi 2012). They tried to emphasize the existential role of places and nonplaces, looking at them through the lens of categories such as perception and lifeworld. This optic is not unjustified; on the contrary, it resulted in many inspiring interpretations of places, but it also offered a rather broad perspective on the role of architecture and design in society. The postphenomenological approach (Ihde 2009; Verbeek 2011), which I am going to use in this chapter, focuses our attention on more concrete aspects of human–artifact relations and allows more precise arguments in the discussion about the moral, social, and political meanings of nonplaces.

By applying postphenomenology to architectural analysis, it is possible to see the multistability of the solutions used in the design of various places.

However, the benefits of the postphenomenological approach become even more apparent when—through the categories used in this theory—we can see how artifacts play significant roles in regulating human bodies and behavior, and in the interpretation of places and interactions. Moreover, the postphenomenological perspective proves that objects are not neutral. There are values and norms in artifacts, and architecture is not free from the "scripts" of use, built into its concrete material solutions. The aim of this chapter is to "de-script" (Akrich 1992) the design of nonplaces through the postphenomenological approach, analyzing the embodiment, alterity, and hermeneutic relations between the user of nonplaces and artifacts or technological solutions, "built-in" by the architects and designers.

For the purpose of this chapter, I firstly analyze the significance of nonplaces in contemporary architecture and the difficulties related to finding their proper definition. It is, primarily, a problem of social control expressed in the design of different places, depending on whether they are private or public. I argue that nonplaces are quasi-places, not entirely public, and their design is closely connected with the function of control. Secondly, I indicate the role of postphenomenology in the discussion about the human–artifact relations, arguing that, thanks to this approach, moral and political dimensions of objects and places became a matter of philosophical interest. Referencing the relations between humans and technologies found through the lens of postphenomenology, I prove that the design of nonplaces is, in fact, contradictory to the usual assumptions about embodiment, alterity, and hermeneutics made in this approach.[1] I suggest that the design of nonplaces should, rather, be understood as *disembodiment*, *nonalterity*, and *hermeneutics of exclusion*, which, however, can be perceived ambivalently. Since the picture of nonplaces seems to be one-dimensional in its negative, disciplining role, I propose to nuance it by presenting also the positive moral and social aspects of steering human behavior. Taking into account that the postphenomenological optic reveals the antirelational or negatively relational role of artifacts in nonplaces, I propose to name this double role of artifacts *two-dimensionality*. In the conclusions, I recapitulate the main assumptions and sum up the arguments about nonplaces, situating them in the context of the *two-dimensionality* of artifacts and the *multistability* of the *relations* they generate.

PLACES, NONPLACES, AND PUBLIC PLACES

From the anthropological and social points of view, it is not easy to define the concept of place. It is usually connected with a territory that has a historical or local meaning, and because of that it expresses values shared by the community and forms the feeling of belonging (Žukauskienė 2016). That is why a

place is usually connected with notions of roots and home (Relph 1976). This approach to places is unsurprising from the existential point of view. In her famous book, *The Human Condition*, Hannah Arendt (1958) states that "the earth is the very quintessence of the human condition" (ibid., 2), and the fact that territory is important to us is connected with the struggle to survive in terrestrial circumstances. Martin Heidegger (1971) analyzes the significance of place, saying something even stronger than Arendt, that "the way in which you are and I am, the manner in which we humans are on the earth, is Buan, dwelling. To be a human being means to be on the earth as a mortal, it means to dwell" (ibid., 2). The human being has to dwell on the earth, and therefore has to settle, find a place to live.

The growing interest in the spatial dimension of human life begun with modernity and the development of technologies that gave people new means of transportation, communication, and information sharing. That is why, when defining the difference between a place and a space, Michel de Certeau (1984) points to the problem of movement. A place is the order that determines the position of a thing in relation to other things. A space, on the contrary, is the crossing of things in a movement. "In short, *space is a practiced place*. Thus, the street geometrically defined by urban planning is transformed into a space by walkers" (ibid., 117).

However, considering the existential significance of places as the expression of human living—how can we understand nonplaces? Are they places too? What role do they have in the human condition? Are they public places or not?

As it is defined by Marc Augé (1995) "supermodernity produces nonplaces, meaning spaces which are not themselves anthropological places and which (. . .) do not integrate the earlier places: instead these are listed, classified, promoted to the status of 'places of memory', and assigned to circumscribed and specific position" (ibid., 78). For Áuge, supermodernity is defined by the overabundance of events, overabundance of space, and the individualization of references (ibid., 109). It has to do with the postmodern reflection about popular culture as consumerist and highly individualized, with the acceleration of speed, globalization, and contraction of time, caused by technology that allows real-time reaction. To fulfill people's supermodern needs to shop, to travel, to work globally, it is necessary to build proper infrastructure. Nonplaces are the expression of these needs. It is important to notice here that nonplaces are usually defined as spaces with specific roles. Odeta Žukauskienė (2016) points out that postmodern (or supermodern) spaces are "a combination of new technologies, rationalized organizations, and settlement re-composition imposed by economic changes. Postmodernity therefore produces nomadic spaces and we observe the transition from a sedentary to a nomadic world" (ibid., 109; see also Castells 1989; Urry 2007).

In the discourse about places and nonplaces, it should also be considered whether they are private or public. In the case of private places, their design is less controversial; however, there also are examples of how their design influences the nearby area. From the social, political, and ethical point of view, public places are more important, because, by definition, they are created for everybody. Michael Brill (1989) explains that a public place is a space where it is possible to meet strangers (ibid., 8). Thus, almost every place where it is possible to encounter people who are not part of our private sphere can be considered public. In the case of architecture, mainly urban areas are treated as public spaces, because of the infrastructure that is based on streets, plazas, parks, and so on (Francis 1989, 152), but it should be noted that a small-scale neighborhood is also a public space (Brill 1989, 13). Mark Francis (1989) argues that "public spaces are participatory landscapes. Through human action, visual involvement, and the attachment of values, people are directly involved in public spaces. People claim places through feelings and actions" (ibid., 148). As we see in the case of public places, their visual dimension is one of the most important aspects of their perception. If they are "participatory landscapes," they are used mainly for realizing the aesthetic aim of beauty, but, of course, they are coshaped by the people engaged in their creation, use, conservation, and so on.

Moreover, public places are such spaces that should, in theory, be open for everybody (Mitchell 2003). Each citizen should be treated equally, so the possibility of participating in the common places should also be assured. This assumption is based, beyond the political and democratic justification, in the discourse on social control (Lefebvre 1991; Harvey 2009). In the democratic society, people should not only have access to various places, but they should also have equal opportunity to decide about them.

Social control can have at least five meanings: presence, use and action, appropriation, modification, and disposition (Francis 1989, 158). Presence means that people have access to a place and a right to be there. Use and action are connected with a particular activity that is possible when we occupy different places. Appropriation gives a person or community a feeling of property—this is an either weaker or stronger bond with a place, and it can be temporary or permanent. Modification means that users can change the space, on the level of its design or embedded technologies. Disposition is linked with the feeling of ownership that can be transferred to other people. All this explains that social control can be understood as the ability to actively participate in the discussion about public places; however, it is usually done through the use of things (Bijker 1995).

Interestingly, Bruno Latour (2005) translated the Latin term res publica, which is usually used in relation to a republic and the political impact of the public sphere, as "public things." For Latour, it means that different things

help people to gather and to discuss problems (Verbeek 2011, 113). It is a question of whether nonplaces are still such gathering places or not. As it is indicated by the analyses of nonplace design, there are plenty of examples that nonplaces are not public places in the sense of being open for everybody. Nonplaces are usually perceived negatively, as spaces where no real events happen (Pütz 2012), because they are only spaces of flow, points on a map through which people have to pass, or which only have to be visited briefly and then escaped from as soon as possible. To use a Deleuzian term, nonplaces can be understood as "any-space whatsoever" (Deleuze 1983). Nonplaces, being similar to one another on the level of functionality and design, have no significance. It is not important whether we are at the railway station in Berlin or London—the infrastructural solutions should be similar and easy to identify.

Nonplaces are not public places in the sense of being a gathering place, a place of important events or decisions which makes them *quasi-places*. That is why their social, ethical, and political role was missed in the philosophical analysis of places and spaces. This gap can be filled by applying postphenomenology to the research on such places' design.

POSTPHENOMENOLOGY OF TECHNOLOGY AND ARCHITECTURE

According to Karl de Fine Licht (2017), design of nonplaces is often focused on steering human behavior in order to avoid unwanted actions and people. It is called "defensive planning," "excluding architecture," "disciplinary architecture," "hostile architecture," and so on (ibid., 27). The main task is to plan in advance who should have access to the space or building. It is a common practice to design nonplaces in a way that regulates the flow of people, because it is a sphere of human interactions designated by the symbolic mark of territory and occupied by a certain person or people (Goffman 1963, 1971). There are a number of technologies designed to emphasize the feeling of social control: gates, scanners, cameras, control points, loudspeakers, and so on (Sharma 2009). That is why, in spaces such as airports, the main impression made on the user is control—regular verification whether he or she can occupy a certain place or its individual areas triggers the person's self-control, as they have to identify what to do in order to go through (Dodge and Kitchin 2004). Analyses of particular architectural and design cases are important for indicating the problem of the "hostility" of the urban spaces toward citizens or users, and making the designers aware of the social consequences of their designs. However, until now, such studies have often overlooked the relations that are built between the user and the artifact and the consequences of using hostile artifacts.

Postphenomenology of technology is one of the most influential theories examining human–technology relations. Considering the perspective on human perception and behavior offered by the phenomenology of Edmund Husserl (but also of Martin Heidegger and Maurice Merleau-Ponty) as well as John Dewey's pragmatism, postphenomenology elaborates how human–technology relations can be understood both theoretically and in practice. It distinguishes four main types of relations between human beings and technological artifacts. The first one is embodiment—to use, to perceive, or to have contact with various artifacts, means to embody them, to make them parts of the human body (Ihde 2009, 42). A good example of this is a bow, which has no practical meaning unless it becomes part of the human body. Moreover, the proper use of the bow assumes adjustment of the body to the artifact, as it learns what to do with this new extension. Embodiment, according to Don Ihde (2009), means that technologies are not only separate beings—they mediate people's relations with the external world, but they are also an artificial, additional, and sometimes necessary equipment of a person. The second relation is hermeneutics—some artifacts need to be interpreted to reveal new meanings. This is the case for all the technologies that have to be "read." A simple example could be a clock that tells the time—if we know how to interpret the movement of its hands. The meaning of artifacts is mainly practical, but it can also be ethical, political, or social. The third relation is alterity. It is possible, according to Ihde, to build relations with an object treating it as a *quasi*-other (ibid., 43). Some artifacts force us into contact with otherness, which can have great ethical and social consequences. Technologies can test our moral values and can train us in our perspective on various social roles, situations, and identifications (Gertz 2018). The last relation analyzed by postphenomenology is the background. Ihde points out that there is always a material, environmental context, where all the other relations happen. In a technologically saturated environment, people are not always aware that their surrounding is equipped with technologies that change its physical conditions. Technological background is a permanent element of everyday life.

As a theory of mediation, postphenomenology also emphasizes the significance of morality in artifact design. Design is "materialised morality" (Verbeek 2011, 90), which means that both designing and using objects are linked to values. The example here could be the traffic lights that regulate street traffic and force drivers, as well as pedestrians, to act properly by adhering to their directions. We can imagine that without traffic lights it is also possible to follow the rules of safe behavior on the streets; however, it is easier to delegate the regulation to the artifact. The behavior of the driver or the pedestrian is mediated by their correct interpretation of signs emitted by the artifact.

Peter-Paul Verbeek (2011) argues that morality takes part in the design process mainly in two situations: (1) designers try to predict all the different ways things can be used, also the undesirable ones, (2) designers try to "build" morality "into" the artifacts (ibid., 91). Of course, there are many examples of unintended consequences of implementation and use of artifacts; however, in this chapter I will focus mainly on "building morality into" the society through technological mediation. Hans Achterhuis (1995) contends that the material environment, as well as people, should be moralized (see Verbeek 2011, 95). Exactly this happens in the case of nonplaces; however, it has rather morally ambivalent influence on social behavior, politics, and social relations.

DISEMBODIMENT IN NONPLACES

The relation of embodiment means that the artifact becomes part of the human body. Artifacts take part in the process of cognition and perception of the external world; however, perfect embodiment should make technology invisible: "The technology 'withdraws', as Heidegger says, it becomes *quasitransparent*, as I say, and thus the technology here is not 'object-like'. It is a *means* of experience, not an object of experience *in use*" (Ihde 2009, 43). However, nonplaces are rarely equipped with artifacts that would make them comfortable for the body (e.g., metal or stone seats on bus stops are usually hard and cold, and cannot be occupied for extended periods of time). Moreover, the design of these places is often strictly focused on disciplining the body or even its exclusion. There are famous examples of benches designed in a way that makes it impossible to sleep on them; spikes installed in places that would otherwise be comfortable to sit or sleep on, in order to make such activity unbearable; obstacles that limit bikers or skateboarders; even sounds, lighting, and plants are used for this purpose—all of this has been called "unpleasant design". Unpleasant design usually addresses three aspects of things, which regulate human behavior: material structure, certain shapes, and the authoritative character (Savicic and Savic 2014, 3).

We can observe such "innovations" in the material environment, especially in the areas of railway stations, bus stops, and airports—in spaces where people are not welcome to stay for longer periods of time. Of course, such exclusion of the body does not affect different social groups equally. Usually, it is dedicated for homeless people, and it has strong psychological consequences for how they perceive themselves, knowing they are being removed by technologically mediated practices (de Fine Licht 2017, 31). However, it is also directed against young people, children, people with disabilities, and the elderly (Karsten and Pel 2000). Also women can be excluded, when we

look at architecture as expression of male culture (Irigaray 1993). There are many more social groups that feel the consequences of unpleasant design than is apparent at first glance. Therefore, I would like to name the practice of designing objects that create borders or regulate time spent with them as *disembodiment*. To use these objects, we have to adjust our body to them—sitting on a bench that has an uneven surface is possible, but not comfortable (Savicic and Savic 2014, 4). This is why such objects cannot be embodied completely and cannot become invisible, as it is suggested in Ihde's analysis of embodiment. Unpleasant design is aimed precisely at making various places evil for human bodies.

NONALTERITY IN NONPLACES

Alterity relations in postphenomenology mean that we can interact with technologies, which take on the role of *quasi*-me. This is because technologies can be designed for interaction or imitate human behavior. Like toys for children, some of them can be activated by proper use. Ihde (1993) explains that a child's top could be a good example of such a relation:

> The child's top is just such a technology-as-toy which may become an alterity relation. Set in motion, the technology itself becomes an object of fascination. It has a quasilife of its own, even apparent self-movement which is unpredictable. It becomes a quasi-other to which the child can happily relate. (ibid., 108)

Through the contact with artifacts, we can become more open to the "other." Ihde suggests that in the case of a child's top, the interaction between the child and the top can be happy, so technology becomes a source of fun and enjoyment. However, the relations between human beings and artifacts are not always so smooth. The example of robots (Gertz 2018) teaches us that technology is sometimes perceived as a rival or competitor. Even a top expresses more than simply child's happiness. Nolen Gertz indicates that

> In his example of the spinning top, Ihde further suggests that the animatedness of an object can lead us to see it as "quasi-autonomous," as if it has a "life of its own." It is for this reason that in alterity relations, unlike in embodiment and hermeneutic relations, technologies do not operate by fading from view to serve as means to some further end, but rather operate by becoming the focus of our attention. (ibid., 8)

Alterity relations make artifacts interesting to people and force them to interact with new objects in a way that is out of the ordinary. Otherness in the form

of an artifact helps us to reconsider the assumptions that we have about human interaction with the external world and, what is also important here, with each other. Gertz emphasizes the functional role that artifacts play, through which we can see the functional patterns in the relations between people.

If we take into account the different designs of nonplaces, it is uncertain whether the "otherness" of technologies really helps us to have deeper relations with the surroundings. Henri Nouwen (1975) argues that the designs of different nonplaces are rather similar. Usually, they have to fulfill expectations that are the same for different people, so we can easily identify the different nonplaces with their functions when travelling or moving from one place to another. This aspect can sometimes make nonplaces feel peaceful, a space where people can relax, suspended "in-between."

Alterity in the design of nonplaces can be understood as: (1) technological solutions that assist people in identifying where they are and how to find what they are looking for, (2) interactions with the "other," in the form of a stranger. As an example of the first type of alterity, we can look at all the technologies that play an informative role: tables, screens, maps, signs, sometimes even robots, and so on. They are usually created by, first, predicting human behavior and potential problems. These are the objects usually analyzed by postphenomenology of technology—concrete material objects with which humans can interact. The second type of alterity, which has to do with the "strangeness" of other people, has been most often addressed by communication studies. Nonplaces are places of peculiar interactions—rather short, immediate, focused on certain aims. Interestingly, nonplaces also have significant representation in the studies on virtual communities. People using mobile technologies and wireless internet check-in at different nonplaces, creating communities around them. That is why there is a huge interest in developing apps that engage people in nonplaces and connect them with other users of such places (Cranshaw et al. 2016).

However, there is a question whether objects, even those designed in a manner that predicts the ways people will use them and then adjusted to human behavior, can really be a good example of alterity. Also, if we talk with a stranger through an application's chat, are they really the "other"? I would argue that the design of nonplaces, their function, and the order they aim to introduce, which are 'installed' into the objects, all aim to be as unsurprising as possible, and thus the interactions with the objects express *nonalterity*.

HERMENEUTICS OF EXCLUSION

Nonplace design has a strong hermeneutical meaning, as it was said above. Nonplaces are not private; however, they are also not public, in the sense of

being accessible to everyone. They are, rather, spaces "in-between" places that are really meaningful to people. Technological solutions used in non-places cannot be embodied, nor do they help people to be open to alterity, they even "tell" us that they are not socially and politically neutral. From the postphenomenological point of view, the "talking" of things has two aspects. On the one hand, we are looking at the external world through artifacts, which can show us their completely new dimensions, on the other hand, our task is to properly interpret the data revealed by things, in order to give them a voice. Ihde (2009) states that scientific procedures are based on the relation with artifacts, which are nonlinguistic, but still somehow express themselves:

> With the natural science examples (. . .), notice that the object realms investigated usually do not contain "linguistic" dimensions. There are no texts, no speech, no propositional or rhetorical expressions. To observe, whether in the limited passivity of astronomy or the highly interventional practices of particle accelerators, is to enact the questions asked through material, instrumental means. (ibid., 68)

In the case of nonplaces, speaking can be understood literally, when we have signs or written information telling us what is allowed and what is prohibited in a certain area. For example, we can follow the instructions on the screen of a ticket dispenser to buy a ticket, so we can "listen" to the machine to accomplish our goal. There are also less literal ways in which things speak. A stone bench with an uneven surface says "do not occupy me for too long," an area where a mosquito buzz is played through hidden speakers says "young people, you do not want to gather here," and so on (Savicic and Savic 2014, 8). The way people understand themselves and their world also depends on the artifacts. However, the meaning that we discover through them can be ethically, socially, or politically ambiguous. De Certeau (1984), writing about the city and its architectural solutions, indicated that:

> On the one hand, there is a differentiation and redistribution of the parts and functions of the city, as a result of inversions, displacements, accumulations, etc.; on the other there is a rejection of everything that is not capable of being dealt with in this way and so constitutes the "waste products" of a functionalist administration (abnormality, deviance, illness, death, etc.). (ibid., 94)

According to him, the city and all modern architecture are part of political divisions. This perspective helps to see the ideological meaning of design and, even if the most striking dimension of the division is the exclusion of the body, it is still the body of certain people and certain social groups. There are two types of technological solutions that are used to "tell" people about the

norms and values in nonplaces: devices and objects. By devices I mean technological systems: air conditioning, lighting, sound systems, cameras, and so on; and by objects, various material installations, such as benches or unpleasant surfaces (Savicic and Savic 2014, 9). All of them are used to express their (non)flexibility, (non)negotiative character, and the fact that their role in the nonplace is defined in advance.

Looking at the world through the material equipment of nonplaces informs us that there are people who are excluded from participating in the area. I propose to call it the *hermeneutics of exclusion*. Usually, exclusion applies to loiterers and homeless people, who are not welcome in nonplaces. However, the nonneutral design that delegates the morally "positive" as well as "negative" values to the artifact affects also children, women, the elderly, the minorities, and so on.

Hermeneutics of exclusion could also mean that people are safe and calm in the given area, that they do not worry about the external world, because they are encapsulated in the material borders. Interpreting Áuge et al. (2006) say "that non-places are a phenomenon through which we traverse and re-emerge (i.e. they are transient) and it is the temporary surrendering of individual identity which we can experience as pleasurable" (ibid., 56). Exclusion could mean that someone is excluded because he or she has no access to the place, but it can also mean that someone's identity becomes limited to being the occupant of the seat number indicated on their ticket or boarding pass, which is at the same time the confirmation of their good moral intentions and innocence (ibid., 58). So, the exclusion of personal identity also happens when people who do have access to the nonplaces become "the passenger," "the customer," "the tourist," and so on, once they pass the material border of the gate or the door.

ONE-DIMENSIONAL NONPLACES?

The postphenomenological analysis of nonplace design explains that nonplaces are not as open as we would usually like them to be, that they have a "built-in" (im)morality, and that they are not neutral from the social and political point of view. That is why, in the discourse about nonplaces, there are more critical than enthusiastic voices, and seeing the regulative role of such design as user-friendly becomes more complicated. However, such one-dimensional perspective on nonplaces omits the examples of artifacts where steering human behavior results in positive consequences.

For example, the blue light used by the Japanese Keihin Railway on metro stations prevents suicides, because people feel better when surrounded by this color (Savicic and Savic 2014, 8). Steering human behavior by color or music

can prevent not only the unwanted, from the disciplinary point of view, activities, but can also prevent situations that are dangerous to people themselves. Prevention also means prediction of the various forms of damage that people inflict on objects. Thus, colorful metro stations, with graffiti painted by artists, anticipate such behavior. These station designs include colorful walls in advance, which limit situations of damage by unsolicited graffiti. It is also commonly accepted that people can and should feel safe in various places, including nonplaces. Bus stop designs that make it impossible for homeless people to sleep there or to panhandle make these places more comfortable for regular users. There is an interesting argument for "evil design" in nonplaces, that it turns our interest toward places which are designed specifically to fulfill the needs of various social groups. Properly prepared skate parks make riding skateboards safer (Forsman and Eriksson 2001). Playgrounds adjusted to the age of the children and types of activities are much better than open areas with no structures for fun and play. Walls prepared for graffiti artists to use allow others to see graffiti not as vandalizing public space but as a work of art. Finally, shelters for homeless people, with adequate conditions providing safety and rest, are definitely a better solution to homelessness than living on the streets, always being vulnerable to various forms of violence or disrespectful behavior from other people.

Besides the aspect of design through which it is possible to see the different levels of human–technology relations, it is also important to see the social value of nonplaces. Nonplaces are not necessarily placeless or without meaning for people. Such a negative perspective can be understood in big cities, where many nonplaces are seen and used every day. However, a bus stop in a small village could be a place of social gatherings, having a multistable role of a bus stop, but also a public bench, public roof, small shelter for everybody (when the design of a bus stop takes into account changing weather conditions) in case of rain, and so on, also for tourists. Some nonplaces play a significant role for the local community because people are used to them. They are part of the local landscape, often being an example of old-fashioned architecture, a place of collective memory, the most important place in town or village, because they allow connection with other places. These kinds of influence nonplaces can have on people, not always only users, should not be missed.

CONCLUSION

In the chapter, I analyze the architectural and design dimensions of nonplaces, understood as spaces of flow. It is, according to Áuge, characteristic of supermodernity that such nonplaces are produced and it is directly connected with

the technological changes in transport and communication and with processes of globalization motivated by capitalism. There are plenty of studies of the definitional boundary between a place and a space in the context of nonplaces, and there is research on nonplaces indicating that, often, their design is not user-friendly and can even be perceived as hostile. However, until now, all these analyses were focused on the attempt to understand the phenomenon of nonplaces or evil architecture, and not on the relations between the users and objects. This approach becomes possible with employing the postphenomenology of technology. In the chapter, I analyzed how three kinds of relations developed by postphenomenology—embodiment, alterity, and hermeneutics—can be understood in the context of nonplaces. They are all treated neutrally by Ihde, but when the perspective of Achterhuis and Verbeek is applied, it reveals their moral (and social or political) significance. The idea that it is possible to delegate morality to objects through the design process is promising, because certain values that are otherwise difficult to enforce can be propagated by the mediating role of artifacts. However, the analysis of nonplaces through the postphenomenological categories revealed how complicated it is to define values in places that are neither completely public, nor private, but rather "in-between." When looking at the embodiment relations, it becomes visible that nonplaces are often designed with a hidden assumption that the comfort of the human body is not the priority, or even that the time the place can be occupied by the body should be limited. It emphasizes the *disembodiment* in the relations between people and these objects. Examples analyzed in the chapter also show that it is impossible to forget about these artifacts while using them, which indicates alterity is a possible type of relation. Alterity assumes that the artifact becomes the "other," which forces us to interact, stimulates our curiosity, or simply expresses its presence. Nonplaces equipment can be uncomfortable from the bodily point of view, but it is very rarely surprising for the users. Each nonplace has a defined role to play, so the script of its use should be similar to others like it, to provide a smooth flow of people and their predictable behavior. Even otherness, understood as human interactions with one another, does not necessarily mean openness to alterity. That is why such spaces are often the same and indicate *nonalterity*, rather than alterity, as a required quality of their design. Finally, scripts that are "written" for objects by their designers can have relatively predictable results. In the case of nonplaces and hostile architecture, what things "say" to users is very clear and takes the form of imperatives: "you are allowed to do this and that" or "you are not allowed." Of course, every space shared by people has symbolic boundaries of norms. However, nonplaces are often designed to be nonnegotiable. The meanings they reveal when we look through them hermeneutically at human–world relations show the "built-in" *exclusion*. Nonplace design often excludes people of certain social classes or

underclasses, perceiving them as nonusers or antiusers, which confirms that nonplaces are socially defined as places where people can conduct certain activities, but others are prohibited. Exclusion could also mean the loss of identity—not only the socially constructed identity, as in the case of identifying people with skateboards as skaters, but also personal identity, embedded in the name, role, or occupation. The suspension of personal identity can be perceived as dehumanizing, since people are treated as emblems of general concepts, such as "tourists," but it can also be relaxing and can give one the feeling of anonymity.

Technologies and artifacts that mediate exclusion in nonplaces are the same as in the case of disembodiment and nonalterity, which explains why the postphenomenological analysis of nonplaces can provide surprising results in the perception of object multistability. Artifacts in nonplaces are multistable not because they can be used in a variety of ways (which is usually prohibited or not accepted) as it is understood in postphenomenological analysis—*they are multistable because of the relations* they generate. Contact with the hostile bench is disembodiment, nonalterity, and exclusion at the same time, and only through the postphenomenological perspective is it possible to see all these aspects of the human–technology interaction.

Nonetheless, we should ask about the regulatory role of design in nonplaces. Various technological solutions at railway stations, bus stops, or in shopping centers are not merely created to annoy people with their nonflexibility, but they can also be useful in indicating problems that would otherwise be missed by users.

Nonplaces are *quasi*-public places. People have access to them if they take on the role of a customer or a spectator, and properly "read the script" inscribed in the various technological mediators. Being *quasi*, "in-between" or "placeless," reveals the field of postphenomenological interest that can be called the *two-dimensionality of artifacts*. Analyzing artifacts in nonplaces, through the fundamental postphenomenological relations such as embodiment, alterity, or hermeneutics, simultaneously reveals the contradiction between the theory and the practice. These relations, in theory, indicate the invisibility of the artifact in use, the curiosity in its alterity, and giving the artifact a voice. In practice, nonplace artifacts are rather visible (thanks to their hostile design), unsurprising in their alterity and issuing commands rather than having a voice, because their "script" is written in the form of an order. The artifacts in nonplaces have also two-dimensional aspect, taking into account their moral role. Values that can be delegated to objects, such as the blue light at metro stations or the sound of buzzing mosquitos, are not unambiguously right or wrong, so even their moral, social, and political influence is not clearly defined. In my opinion, such two-dimensional objects verify the limits of postphenomenological approach

and focus our attention on the everyday role of architecture and design. Designers influence our lives, offering various technological solutions for our ordinary activities. Nonplaces, however, can be treated as laboratories for design ideas that can help us to understand the significant roles of things and people around us.

NOTE

1. I do not analyse the background relation, even though it also is a 'core' relation in postphenomenology, because in the case of nonplaces it would require a wider examination of concepts like space, area, and surroundings. Technological changes, for such an analysis, should be broadened to also include the Internet of Things, augmented (or extended) reality, and the role of the technological frame in our construction of places. These issues go beyond the scope of this chapter and should be given consideration in their own right.

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Part III

DIGITAL

Chapter 6

Alterity, Digital, and Analogue

Technological Mediation in Architectural Drawing

Inger Berling Hyams

The house I live in is not only a complex cluster of building technologies, planning technology and echoes of styles and cultures, it is also a drawing. Before it was built it was drawn. In many ways architectural drawing technology is the first of the multiple technologies architecture build upon—a creative practice where yet again numerous technologies play important roles in the making and thinking of architecture. Architecture therefore must be considered a much broader concept than simply the built environment, particularly as quite a few architectural projects are never actually built, but still enter the field of architectural discourse as drawings. The architectural controversy and debate often happen through drawing, once a building is built, it is often too late, which underlines the importance of understanding and engaging with architecture in its drawing mode. However, architectural drawing is not exactly the same as built architecture.

Architecture although multisensory in its built form is often in its making a purely visualist art and this has led to a history of controversies over the role of drawing compared to the finished built architectural piece. As early as 1802, architect and influential architecture teacher Jean-Nicolas-Louis Durand in his *Précis des leçons d'architecture données à l'École Polytechnique (Précis)* warned against the *charms of drawing:*

> In the attempt to produce an effect in the geometric elevation, the designer will add unnecessary parts and sometimes remove necessary ones. If anyone is so then unfortunate as to be misled by the charm of the drawing, the refinement of the line, or the purity of the tints into executing such a design, then not only does the mind of a rational observer remain unsatisfied but the architect's own eye

> is offended by effects and masses totally different from those that he expected. (Durand 2000, 75)

The danger that Durand perceives is the incoherence between the actual built object and the visual representation that precedes it. One could perhaps say that Durand criticizes the manipulative potential of the drawing's reduction of the full sensory experience of the building. Other theorists such as Alberto Pérez-Gomez, however, have criticized the functional, mathematical, and realist approach to drawing, which Durand represents, as reductionist insofar as it reduces the production of architecture from a more open symbolic practice to pure representation. Gomez commenting on Durand's influence writes:

> The very nature of architectural drawing was thus transformed from a symbolic operation to a means without implicit values, and that its sole purpose became the reduction of architecture to idealized building and its precise representation. (Pérez-Gómez 1988, 420)

What emerges behind this controversy are two different approaches to architectural drawing: a functionalist view and a symbolic or artistic view. The functionalist view as seen in Durand is interested in the relation that the drawing establishes with the empirical world, whereas the symbolic artistic view is more interested in the relations and meanings that the drawing establishes with the subject. The hermeneutics have different directions if you will, but they are interpretations nevertheless and seeing the controversy as a classic objective—subjective divide would be misguided. In the subject–drawing–world relation of postphenomenological theory, the mediating role of drawing technology is intricate.

Architectural drawing is an umbrella concept covering several distinct technologies; consider, for instance, the technology of the graphite pencil—a commonplace to us, but not part of architectural drawing technology before the late 1500 (Petrovski 2010). Drawing technologies influence the built environment, and understanding more precisely, how they do so, is key in a critical approach to architecture both as a layman and a professional. A postphenomenological framework is not only enlightening for understanding our interactions with architecture but it also provides structure for an analysis of the mediated creation of architectural drawings. Indeed if architectural drawing is subjected to technology-centered analysis, new light is shed on the common questions of representation. Investigating not just the mediating role of built architecture but the technological mediation involved in the making of architecture should enable a more critical awareness also of our built environment.

Through a quick glance at selected moments in the history of architectural drawing technology, this chapter intends to provide a view of how different technologies influence drawing practice. Architectural drawing does not aim to simply relate to the world in functionalist, scientific ways, but also relates to the imaginary. Therefore, the distinction between empirical and ideational visualization is introduced. On the background of this distinction I investigate a model of human–technology relations that sees a three-way split in intentionality in the drawing situation. I focus especially on a practice of dealing with the drawing as an "other", which I deem is an alterity relation and examine in an analysis with a special emphasis on the difference between digital and analogue drawing. The alterity relation is linked to Donald Schön's notion of balk-talk popular in design theory, and I argue that this is vital for a living creative practice of architecture development. The analogue and digital are investigated in the definitions of Nelson Goodman, which not only disproves many of the worries over digital drawing practices but also raises the question whether there is actually such a thing as "digital architectural drawing" if one does not accept a commonplace techno-essentialist definition. Nonetheless, the argument starts with the materiality of architectural drawing technology.

THE TECHNOLOGIES OF ARCHITECTURAL DRAWING

Although drawing is so common that it can seem almost natural, it is a technology and it has ancient roots. Some suggest that drawing is even older than building technology, as witnessed in ancient caves (see, for instance, Robbins 1994, 7). One of the oldest known architectural drawings is part of a four thousand-year-old statue (Pilsitz 2017, 73). It depicts the plan of the temple Eninnu in Girsu and is etched into a stone plate, which is held by the Mesopotamian ruler Gudea, who is portrayed as an architect.[1] Whereas it is not likely to imagine that architects of that age would have used stone etchings to develop their designs, the statue does seem to suggest that drawing in some form would have been part of their practice, and at least that the plan drawing as a projection was known. Here, already it is relevant to establish the point that drawing technology can be conceived as an interweaving of drawing materials, projections, and practices. The intellectual impact of projections is well demonstrated for instance in art history's description of the "discovery" of perspective in the renaissance. On the other hand, far less attention has been devoted to the material and practice elements of architectural drawing technology, wherefore I will briefly introduce a few perspectives.

Relatively little is known about architectural drawing practices before the renaissance, but as Edward Robbins has argued, in ancient architecture the architects were closely connected with the building of the structure and were not yet released from "their craft responsibilities" (Robbins 1994, 11), therefore perhaps drawing was not quite as instrumental for architects as it became later. Architectural historian Klaus Jan Phillip has suggested that using the drawing as means of persuasion—that is, as client communication—was practiced already in the Middle Ages (Philipp 2008). Along a similar vein, Antonio Corso has argued—although with little evidence to back it up (Stinson 2017)—that there from Roman times were a distinction between *project drawing* and *construction yard drawing* (Corso 2016, 48). Vitruvius also describes drawing as a very common practice for architects, and a core skill (Vitruvius 2017, book 1, chap 1.4), but there is little deliberation to what it entails. From the renaissance on, both a large body of drawings and several architectural treatises form a more solid foundation for knowledge about architectural drawing practices, although as Robbins argued in is seminal book *Why Architects Draw* the social production of architecture up until his book had been overlooked (Robbins 1994, 5). Robbins is apprehensive that things that go without saying quickly can become powerful social mythologies and therefore encourages investigation into the practice of drawing (Robbins 1994, 8–9). Robbins' study in many ways was perhaps a predecessor for a rising interest in matters of *practice*, exemplified by, for instance, Dana Cuff's *Architecture: The Story of Practice* (1992) and the more recent work of Albena Yaneva (2016). For the past few decades, as Yaneva has argued, much of architectural theory considers architecture as a function of society, or alternatively as a determining force in the production of society (Yaneva 2016, 39). Yaneva criticizes this for falling into cause and effect readings of architecture in relation to society and to uphold a technology and symbolism dichotomy in architecture (see, for instance, Yaneva 2016, 1, 18 or 36). Instead, she calls for an ethno-methodological approach to architecture that maps, describes controversies, and asks the questions: 'How does this building work?' and 'how was it made to work?' (Yaneva 2016, 21). Yaneva's controversies are mainly set in a public sphere but the controversies are also materialities that coshape architecture and they begin on the drawing board. Each line drawn and erased—each iteration—is a drawing controversy in a very small scale.

The materialities of architectural drawings are needless to say an important part of 'how a drawing was made to work' and if the renaissance is generally held as a pivotal moment for the nonmaterial developments of architectural drawing, the following centuries and perhaps particularly the nineteenth century saw several important innovations in material drawing technologies. The graphite pencil, ruling pens, mass-produced tracing paper, and the invention of

the blueprint are examples and as architecture historian Alexander Ortenberg has argued, there has been surprisingly little development, in architectural drawing tools since the nineteenth century (Ortenberg 2010, 668). Two important exceptions being of course the inventions of computerized drawing as well as—and perhaps somewhat overlooked—roller and felt-tip pens.[2] None of these different drawing technologies mediates in the exact same way, but through their differences in materiality, projections and practices open and close off different stabilities, albeit none of these can be seen as determining. To give a couple of different examples within drawing technology let us take the pencil, transparent paper, and reversibility in digital drawing.

The graphite pencil as a drafting implement likely developed from the stylus, which was known at least as a writing implement (on tablets of clay or wax) from Roman times. In the renaissance, metalpoint styluses were used by artist such as da Vinci to draw. Ink and pencil brush are drafting and writing implements that are ancient, but from the eighteenth century, ruling pens with adjustable line weight and India ink that does not wash out so easily after it has dried became more and more commonplace (Ortenberg 2010, 673; Price 1994). Henry Petroski, in his history of the pencil, has described how the pencil emerged in the second half of the 1500s. A Swiss naturalist, Gesner, writing in 1565 is the first to describe the new type of writing implement, but as Petroski argues, it was probably already widely used by naturalists as well as artists (Petroski 2010, 46). The graphite pencil combined two desirable qualities for writing and drafting implements, namely, of dryness (like the metallic stylus or charcoal), which made it both easy to use in the field as well as less prone to smudging and disappearing but remaining distinct even when papers were handled often, and a dark durable line—like ink and pencil brush on paper (Petroski 2010, 17). An interesting added feature is of course that it is much easier to erase than ink, which can only be scraped off once applied. Thus, the pencil to a higher degree leaves room for error correction, additions, and reductions. Interestingly, most architectural schools and practices have kept a practice of using pencil work mainly for sketching whereas all finished work would be "inked in." Possibly, to counter the erasability of the pencil lines, which could create uncertainty both with regards to contractual building drawings and exams. Whereas one of Petroski's points is that technology, as soon as it becomes accessible, impacts practices, Ortenberg conversely sees practices as socially rather than technologically impacted and describes how the change that he detects in the use of working drawings in the nineteenth century is determined more by the societal relations between architect and builder than strictly by technological development (Ortenberg 2010, 674–75; Ortenberg 2000). From a postphenomenological point of view there is no either or here, but a natural coconstitution between the social practices and the material technology.

Blueprinting techniques although widely used to copy especially technical drawings, in architecture in the first half of the twentieth century (see Axelsson 2016, 23) of course impacted the distribution of the drawings but is unlikely to have impacted the design practice of drawing as blueprints would have been made of more finished drawings rather than of design development (see Ortenberg 2010, 672 for a similar point). The purpose of the blueprint was communication, mainly with builders and technicians. Tracing paper, however, is more likely to have influenced the very practice of idea development through drawing, especially when it from the late nineteenth century became less expensive. Until the 1970s a good deal of architectural drawings were made by hand on transparent paper (Axelsson 2016, 22). Transparent paper has been known since the Middle Ages but was only manufactured on an industrial scale from the mid-nineteenth century (Axelsson 2016, 22). The conservationist Claude Laroque in a small but likely indicative study of different types of transparent paper and its uses found that technical and architectural drawings most often are made on the mechanically produced beaten type of transparent paper (Laroque 2004, 29). This type of transparent paper also known as natural tracing paper was put into production in the late nineteenth century as a cheaper alternative to chemically treated transparent paper (Axelsson 2016, 27). Ortenberg furthermore makes the point that an important factor in the use of paper is the availability of larger sheets, which are more readily available after mechanization of paper production (Ortenberg 2010, 671). Transparent paper or tracing paper was a mainstay in architectural and engineering practices before the computer and it is still widely used even today for sketching. The reason is of course the transparency of the paper, which enables the architect to put a fresh sheet on top of an existing design and quickly copy the desired features. Additionally, one could draw only some proposed new features on the paper and test how they looked on a separate sheet before making changes to the actual drawing. Tracing paper in this way opens possibilities for relatively speedy work on multiple design directions before making a decision.

Digital technologies are dominant in today's architectural drawing. Whereas many architects still use hand drawn sketches to quickly test ideas, or in communication. Almost all competition proposals, client materials, and so on, are made digitally. Digital design in itself is many different things. Firstly and very briefly, it would be necessary to differentiate between 2D, 3D, and algorithmic design. The 2D design could be called paper simulation, because the drawing surface in only two dimensions simulates that of the classic drawing board, examples would be popular programs like "illustrator" or "inkscape" as well as 2D outputs from Revit and AutoCAD. In simulated 3D drawing, drawing or modeling happens in three dimensions. The view of the designed structure can be altered easily and smoothly, both by changing

position of the eye and by zooming. There is a notable difference between our normal three-dimensional vision and the simulated version in digital drawing, as motion of the head/eyes do not (of course) change the view. Practically the 3D drawing is most often displayed in 2D on the flat surface of a screen, but virtual reality design development is budding. Algorithmic drawing is usually 3D simulations, but the form of these instead of simulation of the classic drawing or modeling motions of an architect is generated through coding (either pure coding or frequently in blocks, like the grasshopper plugin for Rhino). In this way, drawing becomes perhaps more akin to writing.

A mediation stability of the digital drawing that I would like to use as an example is the reversibility. Even though the pencil lines can be erased on a sheet of paper they more often than not will leave a slight indentation where they once where, as trace or a change in the surface structure of the paper. For a digital drawing this is not so. It is fully reversible, and anything and everything can be removed without a trace. Through, for instance, layer and grouping functions that mimic what tracing paper can do, the architect can thus test different elements and without a trace add and remove them from the drawing again. A similar function can be gained from diligent work on tracing paper, but in the digital drawing, the reversibility also stretches to line weight, color, and so on.

In all of the examples it is obvious that the drawing technology has pulled drawing practice in certain directions—it has opened new stabilities. Nonetheless, drawing should not be regarded as stuck in these stabilities, as they are always embedded in the context of practice. The overlaying stability of tracing paper, for instance, in practice has been overruled by the complete reversibility of digital drawing. Moreover, many architects still in sketching situations prefer the creative operations that the unremoveable line on paper necessitates. The point here is not that drawing materialities determine either the outcome or the practice in which it is used, but as all technologies, it does influence the practice. In postphenomenological terminology, it mediates the relation between the architect and the world.

ARCHITECT - DRAWING - WORLD AND THE TRIFURCATION OF INTENTIONALITY

Postphenomenological philosophy as proposed by Don Ihde centers on the technological mediations of subject–world relations. In this perspective the architectural drawing is the technology by which the architect relates to the world. A drawing is of course a visualization and there has been a keen interest in visualization in postphenomenological philosophy (as described in Rosenberger and Verbeek 2015, 32–33). Most of these studies, however,

cover what one might call a functionalist or empirical approach, although mainly in the form of a critique, highlighting these technologies' dependence of human interpretation, and thus a connectedness to a subject. Within post-phenomenological philosophy there has been far less interest in the relations established between visualizations and subjects in the form of imagination and art. Because the two cover quite different practices, it is relevant to make a distinction between what I have called 'empirical visualizations' and 'ideational visualizations' (Berling Hyams 2017). 'Empirical visualizations' use the empirical world as their referent (as opposed to the imagination)—they gain their meaning from their relatively predictable relations to the world. A city map of Paris or an image of Mars would, for instance, lose their functionality and their raison d'être if they were purely drawn from the imagination. However, it is important to underline that this does not make empirical visualizations objective, although it is perhaps for some the aim. Ideational visualizations, on the other hand, are drawn mainly from the imagination. Here the visualization mediates the imagination and does not aim for a precise mapping of something but rather an interesting or productive one. Relating this to design theory, both theorists as Bryan Lawson and Nigel Cross have called attention to that design practice is not a problem-solving activity, but that design work is solution-based (Lawson 2005; Cross 2006). This would fit with the higher emphasis on the ideational specter of visualizations. The architectural drawing, for instance, is a work in progress, as it visualizes places and spaces that do not yet exist.

When architects or architectural students draw, they explore, test, and form their ideas through drawing. It is therefore not so much "the world" that is mediated through a tool to a sensing/seeing body, but the imagination or vague idea that is mediated through the tool into "the world." The architect or designer perceives the "world" through a visualization. Translated into the standard human–technology relations schematics it might look like Figure 6.1:

The simple schema of architect - drawing - world, however, does not seem very satisfying for describing the practice of architectural drawing, particularly when one bears in mind the differentiation between empirical and ideational visualizations, which are not reflected in it. The question that forms is what impact this distinction would have on the human–technology–world relations. In order to answer, a more detailed investigation into drawing

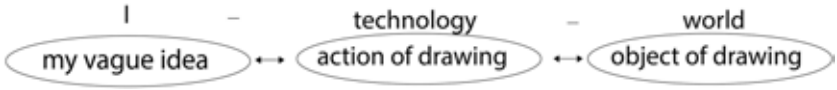

Figure 6.1 Diagram of Mediation in Drawing (Berling Hyams 2017). *Source*: Created by the author.

practices must be undertaken, one which also takes into account the different mediations of diverse drawing technologies.

One of postphenomenology's insights is to analytically differentiate and specify relations, for instance, what Don Ihde has named: (1) embodiment relations: where technology mediates an embodied experience, (2) hermeneutic relations where technology is used to interpret the world, (3) alterity relations where technology acts as an "other" (Ihde 1990). The most straightforward way of viewing architectural drawing is as a hermeneutic technology relation. In architectural drawing "what is being perceived is precisely what cannot *without technological mediation* be perceived" (Ihde 2012, 141), which as Ihde has explained is characteristic for a hermeneutic relation. Projective drawing, for instance, is intended to construct a visualization of a (future) space, the qualities of which can be evaluated through the drawing and so technology and world merge in a simulation. Through conventionalized drawing technology such as scale, perspective, and descriptive geometry, the drawing is used to, for instance, check whether a structure would fit in a certain space. The clear likeness can at first glance disguise how different this drawing world is from our normal perception. We perceive the world in perspective, but common architectural drawing projections such as plan, elevation, and section are orthographic, which makes them more easily measurable and constructible (Berling Hyams 2017, 84). Furthermore, scale makes the building much smaller than it would actually be. Likewise, in plans and sections, the view offered is the imaginative one of a house cut through horizontally or vertically. The hermeneutic relation to drawing is fundamental for understanding the knowledge production that drawing creates. It is in the hermeneutic relation to drawing that we can experience not yet built structures, which is vital to passing judgment on their fitness. "Through hermeneutic relations we can, as it were, *read* ourselves into any possible situation without being there," Ihde writes and adds, "In science, in contrast to literature, what is important is that the reading retain *some* kind of reference or hermeneutic transparency to what is there" (Ihde 1990, 92). In Ihde's words we also get a glimpse of the difference between the empirical and the ideational. The *hermeneutic transparency to what is there* should be understood as what I call empirical visualizations, which in turn would be the scientific or functionalist approach. Literature, as Ihde writes, does not need a referent in the world to be relevant and meaningful whereas science does. Architecture here is an interesting in-between case that does not fit squarely into either the scientific or the artistic tradition. Architectural drawing in order to be buildable must have certain empirical elements that relate to the world with hermeneutic transparency. Conversely, one might argue that in order to be architecture and not mere building it must also have ideational elements, that is, relations to something imaginary.

Whether the drawing is more or less empirical or ideational in a practice situation, the architectural drawing is a technology *through* which the architect gains experiences. Different drawing technologies be they pencil on paper, stone etchings, or digital vector graphics, amplify the body's ability to leave stabile marks. The experience of this is one of embodiment. The drawing tool becomes an elongation of one's body and for the experienced architect it is a near transparent one. Marks and traces are left on a surface with such facility that the designer finds the process completely natural and barely notices. Indeed, we all, regardless of professional architectural training since childhood have deeply sedimented experiences of drawing—be it with chalk on asphalt, lines in wet sand, or crayons in coloring books. The embodiment relation to drawing is so common that drawing seems natural to humans, and most cultures have engaged in image-making of some sort. The embodiment relation to drawing tools is of course not entirely transparent, the experienced draughtsman draws up a 2D pictorial likeness to a building with facility, whereas more novice designers struggle with achieving a resemblance. The transparency largely comes with practice. Practice that aide the draughtsman in, to a satisfying degree, see a replica of light and shadow, proportions, and so on, of an object. Moreover, different drawing technologies require specialized training in some instances. The artist proficient with pencils to the degree that they feel completely natural does not necessarily feel the same the first time she is drawing in a digital drawing program, and vice versa.

Both these examples of differences in embodiment relations and the previous examples of the reductions and distortions of projective drawings in hermeneutic relations demonstrate that drawing technologies are indeed non-neutral technological mediations. This would be the case for both empirical and ideational visualizations, but since architectural drawings mostly are not purely empirical, they are even more complex.

Architectural drawings are ideational, but they often contain both ideational and empirical elements. It could be a site map of the location, plot size, and so on (empirical) as well as the new design (ideational). The new design is though only formed partly from the imagination of the designer. The architect does not have full malleability of the material, believing that is what Ihde has called a designer's fallacy. The designer fallacy is linked to the intentional fallacy, known from literature studies, where the writer's intentions behind the story are sought (Ihde 2008b). This, as pointed out by Ihde, has not been deemed neither desirable nor feasible for a long time (Ihde 1990, 69). Ideational drawing practices therefore cannot be understood as simply a combination of hermeneutic and embodiment relations in the drawing, because the drawing pushes back, some even experience this as if it has intentions of its own. In design theory this is widely known as what Donald Schön in his *The Reflective Practitioner* called *balk-talk* (Schön 1983). The perspectives of the balk-talk or alterity relation in architectural drawing will be treated in the final section of the chapter, but it leads to this more elaborate

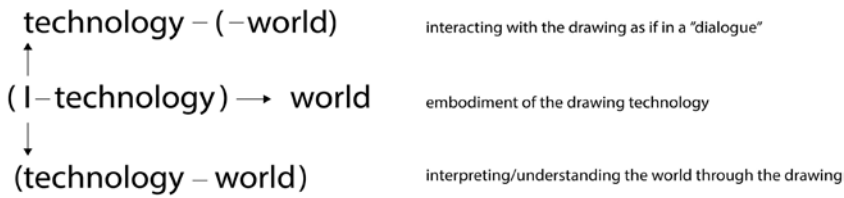

Figure 6.2 Schematic of the Trifurcation of Intentionality. From the top: an alterity relation, an embodiment relation, and a hermeneutic relation (Berling Hyams 2017). *Source*: Created by the author.

schematic of what I have called the trifurcation of intentionality (see Figure 6.2, Berling Hyams 2017), which incidentally resembles Galit Wellner's model on writing relations (Wellner 2017).

The model was originally developed as part of an argument that sought to dispel the "technofears" that some architects have, strongly favoring analogue drawing and viewing digital drawing as dangerous and limiting (Berling Hyams 2017). Architect Juhani Pallasmaa's critique is emblematic. In the article, I admit that there are differences between digital and analogue drawing in an embodiment relation, but refute Pallasmaa's criticism by arguing (1) that analogue drawing is as disembodied as digital drawing as they both are instances of visualism. Drawings persuade us to see as an image instead of giving a more multisensory experience that actual architecture would—cf. the arguments made earlier in this chapter. (2) That digital drawing is not *essentially* mathematic and restrictive, as Pallasmaa seem to think. As an example I use the digital drawing practices described by Claus Peder Pedersen, who finds that one can "create an architectural drawing in which the physical measuring of the conventional architectural drawing is replaced by a consciously casual approach to the forced precision of the computer." (Pedersen 2008, 230).

In hindsight however, even though I criticize exactly this in Pallasmaa, in the article the understanding of digital and analogue come dangerously close to being defined by techno-essentialist criteria. What I have not previously made explicit is that critics of digital drawing miss that whatever the pitfalls are they come out of the human–technology entanglement with the technology. Futhermore, if digital drawing were not defined so narrowly technical then perhaps the critics could be right, it could be advisable to emphasize analogue drawing, but all of this necessitates more thorough definitions of what digital and analogue is.

THE REPRODUCIBILITY OF ARCHITECTURAL DRAWINGS

In *Languages of Art* Nelson Goodman criticizes a common notion that analogue has to do with analogy and digital with digits (Goodman 1976). Whether these

can actually be taken as common definitions or not, there does certainly seem to be a prevalent conflation of the digital with computers and the analogue with everything not digital. The problem here is that this commonplace very narrow techno-essentialist distinction might oversimplify and flatten the analysis of drawing practices. Goodman proposes instead that we distinguish between analogue and digital in terms of density and differentiation (Goodman 1976, 160). An analogue system is dense, meaning that "for every character there are infinitely many others" (Goodman 1976, 160) which gives a lack of differentiation. Digital systems as a contrast are differentiated and unambiguous according to Goodman (Goodman 1976, 161). In visual terms this would relate to the difference between a point (digital) and a line (analogue), and as we all know, from digital printing technology, lines can be made up from points or dots, even though we perceive them as continuous unbroken lines. The question is whether it is not rather our experience of a system or a technology and not so much the underlying technological production in itself that is important.

In "*Artificial Intelligence*" John Haugeland exemplifies the difference between the digital and analogue with the difference between a Rembrandt painting and a Shakespeare sonnet (Haugeland 1989, 55). The painting—as well as the analogue drawing—is slowly decaying—the sonnet will never fade ("for in eternal lines to times though grows" as Shakespeare writes, sonnet 18) because it is written in the digital medium of an alphabet. Digital and analogue in Goodman's definitions can also be linked to his distinctions between autographic and allographic art forms (Goodman 1976, 113). Autographic art forms can be forged and allographic art forms, because they are notational, cannot be forged. One could perhaps clarify by saying that allographic art forms are reproducible whereas the autographic forms are not and this is linked to analogue and digital qualities as seen in the Haugeland sonnet and painting example. The denseness of the analogue painting makes it irreproducible, whereas the sonnet in its digital medium can be copied and distributed widely without ever losing the sense that this is an original Shakespeare sonnet. Architecture as Goodman contends "counts as a digital diagram and a score" although it is a "mixed and transitional case" (Goodman 1976, 221) where we don't feel quite easy about equating architecture with its design or its drawings. On the other hand, it is robustly allographic in the sense that it is not built by the artist himself (Goodman 1976, 221). Consider the example that no one would regard Villa Savoye a fake because Le Corbusier did not actually build it himself. However, if I build a Villa Savoye tomorrow to perfect specs, it would not be considered the original.[3] A real-world example of architectural drawing as a "mixed technology" can be found in Denmark, where there was recently a controversy over the architectural drawings at the city archives in Copenhagen. Most of the drawings had been digitized, that is, scanned in high resolution and to cut costs

(preservation, storage, etc.) the archives were hereafter destroyed. Around a third of the archive suffered this fate before public and political outcries stopped it. Original drawings from landmark buildings like Grundtvigskirken (Grundtvig's Church) and by the hand of influential Danish architects such as Martin Nyrop (who designed among other things the Copenhagen Town Hall) were burnt. The interesting part of this story is that it can certainly be argued that the information from the drawings were not lost, as was the argument of the archival unit responsible for the digitization and destruction. The drawings as information still exist in perfect and more accessible conditions than before their physical destruction, but this is only when the drawings are regarded as purely representational or notational, as digital information. The strong public reaction, however, indicates that this is not the sole view, that there is something more material and irreproducible to the drawings. The city archives has pushed back against the public anger arguing that some of the drawings of the most notable buildings also exist in other archives and that the drawings they had in their archives were in fact not original, but copies, although handmade copies and thereby difficult to discern from original drawings.[4] The complex case will likely remain a topic of debate for years to come, but through the murkiness of it all an interesting observation emerges. What matters mostly is perhaps not the actual technological medium of the drawing but rather how it is related to. Is the drawing in the city archive related to as a representational, functional object that conveys information or more an object d'art? Here we can return to Goodman and Haugeland's definitions of analogue and digital, because although they are still essentialist they also in both cases point toward more relational definitions. Goodman, for instance, writes:

> The mere presence or absence of letters or figures does not make the difference. What matters with a diagram, as with the face of an instrument, is *how we are to read it* [my emphasis]. For example, if figures on a barogram or seismogram indicate certain points the curve passes through, yet every point on the curve is a character with its own denotation, the diagram is purely analogue or *graphic*. But if the curve on a chart shoving annual car production over a decade merely joins the several numbered points to emphasize the trend, the intermediate points on the curve are not characters of the scheme, and the diagram is purely digital. (Goodman p. 170)

Exactitude in other words can be or not be part of how a drawing is composed but it is how we relate to it that is important. Similarly, in the Haugeland example one might add that the Shakespeare sonnet does not give off one exact reading even though it is presented to us in the digital medium of an alphabet. In the case of poetry and literature, language and meaning is richer

than the alphabet. Likewise, a digital system according to Haugeland is unambiguous (Haugeland 1989, 55) but the digitally drawn architectural plan is not necessarily unambiguous. Indeed drawing practices would indicate that not in the least in its making, the digital architectural drawing is something open or even perhaps deliberately *multistable*. Analogue and digital could be seen not with regards to the underlying technologies, but with regards to mediation. Of course, it matters whether a drawing is technologically digital or analogue, but this does not determine a digital or analogue relation to it. Could it be, for instance, that ideational visualizations could be viewed as somewhat analogue regardless of whether they are drawn up on a computer or by hand?

If the analogue system is always dense, and the digital system is always unambiguous, then we might say that ideational visualizations are analogue in the sense that they are ambiguous and dense. To return to architectural drawing, teachers in architecture school that I interviewed prefer to advice students only based on an actual material. Their experience is that the dialogue otherwise easily gets too vague (Berling Hyams 2020, Appendix 7, Anne Romme # 26:53,5–28:39,0; Tine Bernstorff Aagaard # 34:32,1–35:34,8). The ideational drawing is also vague, but as it is material, it closes off some possibilities of interpretation although it always, at least when it is described as being productive, holds multiple openings as well. This is the multistability of architectural drawing, without a certain kind of stability, the drawing would be too vague to communicate or perhaps even perceive. But again the abstraction that the drawing involves would also always make it differ from the actual experience of its object—the drawing in this way is general. Empirical visualizations and drawing approaches that emphasize the functionalist view on drawing would depreciate the multistability of architectural drawing, possibly to gain the air of a more scientific approach. Conversely, ideational visualizations and the more artistic approach to architectural drawing would accentuate the multistability, the sentiment of which I believe is expressed here in the account of a first year architecture student who has struggled to learn how to think in a different way in architecture school.

> It has been very frustrating for me to make this transition to think in spaces—thinking in something where I can't use words to understand it. I'm practicing it now: To simply look at something and just feel what I see. So that it becomes an exchange between the senses rather than converted into words. I'm practicing to look at something, draw something without the need to explain it to myself in my head. (Berling Hyams 2020, Appendix 7, 'Lukas' #6:54,0–8:41,9)

What the student expresses: feeling what he sees, and not explain it, might be seen as working with upholding an ambiguous view on the drawing, an

element of the drawing doesn't mean either this or that, but both and perhaps much more at the same time—similarly to the duck-rabbit image. If ideational visualizations in this way are always ambiguous and dense, then one might ask where this ambiguity comes from, and perhaps why it as expressed in the above quote is so important to stay open to it. That is if we do not accept that it is something inherent in the technology, that makes it analogue that is ambiguous and dense or digital that is exact. A suggestion might be the alterity relation one encounters in creative architectural drawing practice.

ALTERITY RELATIONS IN ARCHITECTURAL DRAWING

How an architectural drawing is physically created and how meaning is drawn from it can be understood through exploring the architect's hermeneutic and embodiment relations to the drawing as explained earlier, but neither of the two forms of relations seems to explain how the drawing also mediates the imagination of the drawer. Architectural drawing is a communication tool, but also a sort of self-communication that forms ideas. For Pallasmaa it is a form of unconscious thinking where ideas emerge *through a* process of embodiment in drawing (Pallasmaa 2009, 92). I would like to propose, however, that some of these creative processes might be better understood through alterity relations—that is how the architect relates to the drawing not just in an embodiment relation, but also as dialogue partner. The alterity relation as presented in the model of the trifurcation of intentionality in the drawing situation describes the way that drawing is not just a direct representation of thought on paper or screen. Qualitative interviews with architecture students and teachers at a Danish Architecture School support this. The pushback from the drawing is by some architecture students directly spoken of as if the drawing had a will of its own. Take as an example a handful of statements:

> Third year student: It's a process that you start, and of course I have some intentions [. . . but] when I start drawing, then it is like the drawing has its own consequence. So I have to follow it. (Translated from Danish, Christensen-Dalsgaard 2011,[5] 27)

> Fifth year student: Often I feel like- as others have also said—the drawing is smarter than you are. You discover levels in it that you haven't deliberately constructed, but suddenly they just attract your attention, and then when you draw up these new connections a whole new world emerges, one that you couldn't conceive on the spot yourself—it is something that has happened in an exchange

> [with] the material. (Translated from Danish, Christensen-Dalsgaard 2011, 178)

> Fifth year student: Often I think that when you begin to draw something then you are in control [. . .] but then when it reaches a certain level, it [the diagram/the drawing] takes over. (Translated from Danish, Christensen-Dalsgaard 2011, 178)

> Programme leader: It has to start with some sort of thought or intention [. . .] but then it rapidly pushes back, one knows that. And you can be absolutely certain that even when you think you've completely imagined just how well it would work when you put these two things together then it never turns out quite so when you draw it. (Berling Hyams 2020, Appendix 7, Anne Romme, # 50:29,7–51:04,5)

> First year student: A drawing also just grows on you. You learn to see things you wouldn't normally see. [. . .] it's a process, you start some place and end up in another place. (Berling Hyams 2020, Appendix 7, #15:15,0–15:42,0)

Each of the statements in their own way describes the experience of the resistance that the drawing process gives the architect. No matter how experienced the student is they do not believe (or particularly desire) to be in complete control of the drawing. The pushback in other words is unlikely to reflect a lack of ability—it would be of course natural for an unexperienced draughtsman not to be able to produce exactly what he aimed for—but here it rather expresses a fundamental creative premise. As is most obvious in the first statements, the unpredictability of the process fosters an experience of interaction with some other entity. It is a sort of radical nonneutrality that is perceived as an encounter with another. In other words, I would suggest that this is a sort of alterity relation established with the drawing, where it is engaged as an entity that can answer questions or even think! "The drawing is smarter than me" (translated from Danish, Christensen-Dalsgaard 2011, 178) a fifth year student told me. In design literature, creative design practice is often described as a sort of dialogue. Donald Schön in his classic book *The Reflective Practitioner* notably calls it the *backtalk* of the material. For Schön the *backtalk* in the design situation is structured around the practitioner asking the drawing a series of "what if" questions which the drawing, not audibly but in an otherwise quite literal manner, answers (Schön 1983, 93–99).

Backtalk or what we with a postphenomenological vocabulary might call the alterity relation is enormously important in Schön's practice epistemology as a way of working rigorously without adhering to normal technical standards for scientific rigor that are difficult to apply to more artistic practices.

The main difference between creative architectural practice and research for Schön would be the architect's interest in change (Schön 1983, 147). In scientific research the researcher seeks simply knowledge, whereas the architect is not primarily interested in how and why a proposal work, but rather *that it does work*. There is not one correct proposal for an architectural project, only several more or less desirable ones (cf. Schön 1983, 151). Schön calls this a *logic of affirmation* rather than a *logic of confirmation*. For the designer or architect "*priority is placed on the interest in change and therefore on the logic of affirmation*" (Schön 1983, 155). The *backtalk* of the situation is paramount here in Schön's argumentation as it hinders the experimentation from becoming mere self-fulfilling prophecy (Schön 1983, 153). He writes, "He experiments rigorously when he strives to make the situation conform to his view of it while remaining open to evidence of his failure to do so" (Schön 1987, 74).

Rigor in design practice does not come from the disinterested objectivity, because the architect is invested in attempting to make things work, it comes rather from a listening capacity, or attentiveness to what the material says. Following Schön, the alterity relations to the drawing are vital to work rigorously. Here we might pick up the earlier established distinctions of ideational and empirical visualizations and the reflections on the analogue and digital. For Schön the drawing becomes a virtual world where reality, materiality, and idea mix. Such virtuality cannot be seen as exact—or digital if you will—because of the mediation that it performs. The dense and vagueness of the ideational visualization can be seen as a necessary openness that enables the back-talk, which in turn might lead to the hypothesis that in the creative arts there is an emphasis on the alterity relation. The denseness is a multistability whereas the exactitude would be seen as a closing off of alternative stabilities. Interestingly, in this manner multistability in the drawing and the alterity relations to it becomes what can enable rigor in an otherwise unstructured approach of the reflective practitioner architect. The architect does not jump to conclusions, but actively through drawing works out a solution, that is, she keeps an open mind to what the drawing might be trying to tell her. In this way the ambiguity emerges through the alterity relation that the architect has to the drawing. Because the architect when she draws to find the form for a project does not have full control of the process but engage in a dialogue with the material as a partner, there is never an entirely unambiguous process. This incidentally is similar with both technologically digital and technologically analogue drawing, making worries around whether or not it was dangerous for students to design digitally futile. It would, however, also in a sense mean that it becomes critical for students as well as practicing architect to be aware of not just the productive use of the backtalk of the material in different

situations, but also to be critical of this backtalk from their material and how it influences them. Such an awareness could only come through reflection and further work on how the non-neutrality of specific drawing technologies mediate their thinking.

Just like empirical findings pointed toward the alterity relations between architect and drawing, they indicate also that drawing—both analogue and digital—is used both creatively and knowingly by the students observed. That is to say, they in their approach to drawing and experimenting through drawing express an awareness to that tools impact thinking but do not determine it. Students explain that they change drawing technology deliberately at different phases in their project or if they get stuck:

> I prefer hand-drawing in the beginning [of a project] and then when it reaches a certain level I go to the digital [. . .] it's always a process back and forth. And then to be concrete it is so that when you've been drawing digitally for 3 days, then you print and do a hand sketch over it. (Christensen-Dalsgaard 2011, 123–24)

The above quote is from a seasoned fifth year student but even a first year student was already aware of working with digital and analogue drawings differently:

> I think that [drawing] by hand is a slower process, so the fact that it is slow might mean that you are more engrossed in it in a different way than on a computer, because it is faster and you can delete and remove things quickly—you can change something quickly. Whereas by hand you are forced to make something out of what you've got. (Berling Hyams 2020, Appendix 7, "Diana" #16:26,5–16:58,2)

Practices like these show awareness of the mediating role of drawing technologies also when it comes to something as personal and preconscious as the imagination.

CONCLUSIONS

Architecture without architectural drawing is almost unimaginable, as a long history of architectural drawing will attest to—also before the renaissance. Architectural drawing, however, does not perform a neutral mediation of thought, as different materialities in the history of architectural drawing technology demonstrate. The chapter first shows how different drawing

technologies mediate differently, that is, that they through certain material stabilities have particular practice propensities. However, I also argue that they do not determine the work with the drawings in the way criticism of digital drawing practices has claimed. Architectural drawing can be regarded as a three-way split of intentionality in embodiment, hermeneutic, and alterity relations. In what I have called empirical visualizations, there is an emphasis on the hermeneutic in the human–technology–world relations, whereas in ideational visualizations the emphasis is on alterity relations as it is the otherness in the relation to the drawing that enables the architect to work rigorously (cf. Schön). The definitions of analogue and digital instead of purely based on technological criteria following my reading of Goodman could be based on more relational criteria. For architecture this means that analogue relations are those that are dense, complex, and ambiguous, whereas the digital are the functional, exact purely mathematical.

Human existence is analogue and not digital in this sense, and architecture as a frame for our lives should be analogue as well, which would necessitate analogue architectural drawing. We are then however talking about not technologically digital or analogue but experientially, relationally digital and analogue drawings, for lack of better words. Attention to digital and analogue relations in technological mediation might be relevant distinctions by which we could further the analysis of human–technology relations, if we do not look at them in a narrow commonplace way.

NOTES

1. See image of statue at "Architecte au plan," Oxford University, accessed May 27, 2019, http://cdli.ox.ac.uk/wiki/doku.php?id=architecte_au_plan.

2. The rollerpen was invented during the 1930s by the Hungarian László József Biró, and first appeared mass produced for the market in the United States in 1945. The felt-tip pen was invented in 1962 by Yukio Horie for the Tokyo Stationery Company. See, for instance, "Drawing Materials," History of Drawing by Thomas Buser, accessed May 27, 2019, http://historyofdrawing.com/drawing_materials/.

3. An interesting counterexample of this is the famous Barcelona pavilion, which was originally torn down, but later rebuilt. The now standing Barcelona pavilion for most visitors counts as the authentic Barcelona pavilion.

4. See the report from the building archive "Redegørelse til KFU om kassation af akter fra byggesagsarkivet," Documentnr. 2017-0379607-5; Accessed November 6, 2019, https://www.kbharkiv.dk/images/files/Nyheder/Redegrelse-til-KFU-om-kassation-af-akter-fra-byggesagsarkivet.pdf.

5. The 2011 study made as part of my MA thesis was published under my maiden name Christensen-Dalsgaard.

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Chapter 7

Sydney Opera House

The Poiesis of Tectonic Architecture in the Age of Digital Augmentation

Adrian Carter and Lars Botin

In this chapter, we shall try to capture some existential qualities in a specific work of architecture by the Danish architect Jørn Utzon, namely, the Sydney Opera House (1969). It is the claim that these qualities are to a very high degree the result of the conjunction of critical, reflexive, and phenomenological thinking of the creator himself, which in the end epitomized in concrete architecture. It is also the assumption that in the building happens a *gathering of the world*, which means that philosophical, cultural, historical, contextual, geographical, and topographical issues are simultaneously brought forth in the building. The building is an exemplary sample of how the ideal and the everyday practical can, or even should, meet in order for *poiesis* to happen.

The chapter is structured according to these philosophical, cultural, historical, geographical, and topographical qualities, even though not considered as distinct with separate paragraphs, but more as an overall framework for understanding.

The last part of the chapter will deal with how recent uses of the monument as screen for digital projections are critical, and in some cases, even morally wrong, as if disrupting the existential qualities of the building.

The philosophical framework of the chapter is mainly phenomenological, referring to, namely, Martin Heidegger, Christian Norberg-Schulz, and Juhani Pallasmaa. In the last part of the chapter, we will try to reflect on the new appropriations of the building through postphenomenological lenses, because hopefully this will provide some sort of understanding in relation to these new appropriations.

THE ORIGINS AND DEVELOPMENT OF THE POIESIS IN UTZON'S WORK

To fully appreciate the origins of the poiesis, the exceptional synthesis between archē and technē in Utzon's work, one should consider the formative experiences of his childhood and early development. As Utzon himself stated "one becomes an architect at the age of 18, give or take 5 years" (Møller, 1989). Though born in Copenhagen, on April 9, 1918, his family moved when he was just a few months old, to the provincial industrial harbor town of Aalborg in Northern Jutland; where his father Aage Utzon took up a position as the chief engineer overseeing the local shipyard. Aage Utzon, who had trained as a naval architect in England, was to gain a reputation as one of Denmark's great yacht designers, most particularly for a type of boat known as a *Spidsgatter*. The *Spidsgatter*, being characterized by its distinctive curvature at both ends. It had its origins in the local herring boats that had evolved from the earlier Viking ships that had set sail from that region of Denmark.

It was from working with his father in his youth, learning to use the tools of the naval architect's trade, such as French Curves and assisting his father in making models of boat designs, that Utzon developed an appreciation for seeing a complex form take shape and come into being. Gaining an understanding of the various forces and stresses at play within the construction, and the inherent qualities of the different materials, even the unique characteristics of different types of timber being the most appropriate for particular parts of a boat. This early insight was to inform Utzon's later approach to the use of materials in his architecture, always striving to select and employ as appropriately as possible the correct material, according to a material's inherent qualities and the task it was being asked to perform. He was always also concerned that the correctly selected materials were dimensioned appropriately, according to their strengths and characteristics, as well as in their relation to the other materials used, so as to create a harmonious construction, as experienced in a finely crafted boat.

Most importantly, Utzon gained in his youth an ability to comprehend and conceive of complex three-dimensional forms, by means of two-dimensional plans and sections, from assisting his father in developing and modeling his boat designs. Utzon would also visit his father's workplace at the Aalborg shipyards, after school and the experience of seeing the great hulls of ships under construction in dry dock, which gave him a further understanding of the relationship between form and construction; as well as the personal self-confidence later in his life, to realize the great boat hull-like roof shells of the Sydney Opera House.

Aage Utzon also played an important role in son's development as an architect, by encouraging in him a deep appreciation of nature; both in terms

of reading natural phenomena, when sailing, but also as a great source of insight and inspiration, as a designer. Utzon's father was constantly revising his boat designs, to make improvements and studied the shape and movement of fish, to gain inspiration as to how to make his boats move faster through the water. Aage Utzon had a personal dictum that he passed on to his son, that one should set aside an earlier solution, as a better solution became more evident. This led him to continually test prototypes and modify his designs, to refine them in the quest for greater perfection. This attitude and working methodology, as well as a striving for perfection, was inherited by Utzon and informed his extensive use of models and his need to construct full-scale prototypes; as a means to test and rework his designs, until he was fully satisfied with the result.

Unable to follow his original ambition of becoming a naval officer, due to poor academic grades, as a result of then undiagnosed dyslexia, and despite an inclination otherwise to become an artist, Utzon chose to study architecture at the Royal Danish Academy of Fine Arts in Copenhagen; where his uncle, a distinguished sculptor, Einar Utzon-Frank, was a professor. Early in his studies, Utzon benefited from the mentoring of two particularly inspirational tutors, Professor Steen Eiler Rasmussen, who was later to author the still foundational textbook that introduces phenomenological thinking for student architects, *Experiencing Architecture* (first published in 1962), and who profoundly influenced Utzon's approach to architecture. Providing Utzon with the means and enthusiasm to experience and understand architecture firsthand, which the dyslexic Utzon much preferred to do, as a means of gaining direct insights and inspiration. Rasmussen's teachings influenced Utzon's consideration of the primary and juxtaposing elements of architecture, such as solids and cavities, scale and proportions, color, texture and rhythm, both through a sensuous directly experiential and intellectually informed understanding. It was Rasmussen that encouraged Utzon to take an interest in traditional Chinese vernacular building traditions, of which he had considerable personal knowledge and introduced Utzon to the Ying Tsao fa Shi, the essential building manual of the Sung Dynasty (960–1279). Its systemization of building components and use of vivid color to express construction fascinated Utzon and became a significant reference for him during the design and construction of the Sydney Opera House.

Utzon's other notable tutor was a leading architect of the time, Kay Fisker, who designed Aarhus University. Fisker was a proponent of constructive logic and material honesty, as exemplified by P. V. Jensen-Klint's all brick Grundtvig Church in Copenhagen. In the construction of the Grundtvig Church, not a single brick was cut and this total commitment to material integrity and honesty became a lasting principle for Utzon also. An approach that was underpinned by the tradition at the Royal Danish Academy, that an

architect was also required to take an extended training in traditional building skills, as a bricklayer or carpenter, before being able to become a qualified architect. The internationally renowned Danish architect, Arne Jacobsen, for example, would impress bricklayers on site visits, perhaps most famously during the construction of St. Catherine's College in Oxford, by demonstrating just how he would like the pointing done (Weston, 2002, 1). This requisite understanding of the technē of architecture has been the cornerstone of Denmark's international reputation in architecture and design until 1968, when the requirement for gaining practical building skills was abandoned along with other radical changes within architectural education, but its legacy continued.

As a student architect, who was interested in vernacular building traditions and fascinated by forms in nature, Utzon reacted against the prevailing international modernism of the time and particularly the austere formality of the architecture of its leading Danish exponent at the time, Arne Jacobsen. Utzon jokingly suggested that all of Jacobsen's buildings could be represented using a matchbox, "flat, it was a housing scheme; standing on its long edge, an apartment block; on end, an office tower" (Weston, 2002, 18). Upon graduating Utzon sought work in Stockholm, where he had the opportunity to experience firsthand the work of Gunnar Asplund and Sigurd Lewerentz, whom he admired greatly and were both known for their humane architecture that was informed by craft tradition and relation to landscape.

Utzon also came to work with the Norwegian architect, Arne Korsmo, who shared with Utzon a fascination with the logical structures found in nature, as exemplified by Karl Blossfeldt's photographic studies of plants and as expanded upon in D'Arcy Thompson's *On Growth and Form*, which promoted an understanding that all shape and form in the natural world follows physical and mathematical principles, as the most economical use of available resources according to the prevailing circumstances. One can say that our human sense of harmony and beauty derives from our inherent appreciation of this underlying mathematical order.

As Utzon states in his personal manifesto of 1948, *The Innermost Being of Architecture:*

> For the architect to work in sovereign control of his means, he must experiment, practice in the manner of a musician playing his scales, practice with mass, with rhythms formed by masses grouped together by colour combinations, light and shade, etc.; he must sense with fervent intensity and generally rehearse his shape-creating expertise. This requires close familiarity with materials; we have to be able to understand the structure of wood, the weight and hardness of stone, the character of glass; we must become one with our materials and be able to fashion and use them in accordance with their constitution. If we understand the nature of

> the material, we have its potential at hand and far more tangibly than if we base ourselves on mathematical formulae and art forms. To the architect, mathematics help him confirm that what he assumed was right. (Weston, 2002, 11)

An understanding of nature and organic growth, form as a diagram of forces, became Utzon's credo early in his career, writing in 1948, that "the true innermost being of architecture can be compared with that of nature's seed and something of the inevitability of nature's principle of growth ought to be a fundamental concept in architecture" (Weston, 2002, 11). This notion of organic growth can be seen in his Langelinie Pavilion competition entry of 1953 and subsequently in his focus on what he termed "Additive Architecture," whereas in nature, an infinite variety can be generated using a modest number of elements.

The organic additive principle became the basis for his approach to architecture; from the design of his courtyard housing, the Kingo and Fredensborg Houses in Denmark, to his development of the "Espansiva" timber housing system through to the manner, by which he reduced the construction of the Sydney Opera House roof shells down to as few elements as possible; that could be effectively prefabricated off-site, tiled, and then craned into position. Thus, ensuring a higher precision and quality of workmanship and most importantly out of concern to create a safer working environment, than if the work of tiling should have been carried out high up on the roofs themselves.

Early in the design process, Utzon had determined that cladding the roof shells in white ceramic tiles would extenuate their sculptural form and best evoke his conceptual vision for the building, as being like clouds. More than simply cladding the roofs in white tiles, Utzon wanted to create a shimmering ever-changing appearance, akin to sunlight falling on freshly fallen snow and the light glinting off ice crystals on the surface. To achieve an effect similar to the "combination of matt snow and shining ice" (Frampton, 1996, 275), an idea that had come to Utzon while skiing in Norway. Utzon decided to use two different types of glazed ceramic tile of a similar character and quality to those he found through his extensive studies in "the homelands of the art of ceramics, China and Japan" as he is quoted in Architecture in Australia in December 1965 (Weston, 2002, 148). Utzon took his samples of tiles from China and Japan to the renowned Swedish ceramic tile manufacturer Höganäs, to produce a type of tile that was not available at that time: "A tile that had gloss, but did not have a mirror effect. A tile with a coarse structure that resembled hammered silver. A tile that would be perceived as true stoneware and would simultaneously give an impression of brilliance as it reflected the light," (Weston, 2002, 152) unique characteristics that, by poetic coincidence, are not unlike those of the natural shells that formed such a significant midden at Bennelong Point.

While there is no direct evidence that Utzon was influenced by the prior existence of this midden or was even aware of it, he did have an innate, intuitive understanding of a sense of place or its "genius loci," as Utzon's friend Christian Norberg-Schulz has written extensively about; as typified by his essay on Bagsværd Church (Norberg-Schulz, 1986, 223–30), citing Utzon as a prime example of an architect with a profound phenomenological appreciation of a site (Norberg-Schulz, 1976). However, Utzon with his considerable openness to other cultures, as like the artists he admired, such as Matisse and Picasso, was greatly fascinated by Indigenous culture and arts, and would have followed that interest more fully, had his stay in Australia not been cut so short.

THE CRITICAL CONJUNCTION BETWEEN THE ARCHĒ AND TECHNĒ: A POETIC SYNTHESIS

Architecture, according to Kenneth Frampton, author of *Studies in Tectonic Culture*, is first and foremost an act of construction that is a tectonic, rather than a scenographic activity. Frampton's notion of the poetic manifestation of construction has its roots in the Greek term *poiesis*. With its origins in the Greek term *tekton*, originally meaning carpenter and further back in time, to the Sanskrit *taksan*, referring to the craft of the carpenter. The more recent understanding of the term tectonic has come to mean more than the well-considered implementation of the carpenter's craft, but more broadly the poetic art of construction and the making of architecture (Frampton, 1996, 3).

Frampton's critique and a broader contemporary rejection of the application of decoration, as a superficial attempt to achieve semantic meaning and architectural significance through nonintrinsic or essential, applied adornments. Rather the tectonic approach in architecture strives for an authentic expression of construction, materiality, and detail. An approach to architecturethat seeks a poetic and meaningful significance through the continuity andintegrity between form and construction. Herein lies the critical conjunction between the archē and technē. A poetic synthesis, between the archē, the creative vision and inspiration that has its origins in a phenomenological understanding, that precedes the artifact and its technical, physical bringing into being, through technē, the domain of pragmatism and postphenomenological investigation to which we shall return.

The term architect itself derives etymologically from the conjoining of archē and technē. Equally so does all meaningfully authentic and enduringly significant architecture depend upon the poetic and successful synthesis between the universal resonance of the original intention or idea and its well-considered and crafted physical realization.

Significant architecture is created, where there is a poetic synthesis, between the archē, the creative vision and inspiration that precedes the artifact and its technical, physical bringing into being, through technē.

THE HISTORY AND INDIGENOUS AUSTRALIAN SIGNIFICANCE OF THE SYDNEY OPERA HOUSE SITE

A building of such profound phenomenological and iconic significance, as the Sydney Opera House, does not come about simply. It is the result of many critically considered and brilliantly informed intuitive creative decisions, over time. As with any work of architecture, the Sydney Opera House's existence began with someone seeing and identifying a need and initiating a project that led to its realization. It was English-born conductor Eugene Goossens, who having taken up the position of conductor of the Sydney Symphony Orchestra in 1947, proposed that the city of such size as Sydney should have "a fine concert hall for the orchestra, with perfect acoustics and seating accommodation for 3500 people, a home for an opera company and a smaller hall for chamber music" (Watson, 2006, 40). Having himself arrived in Sydney by flying boat, Goossens was enamored by a vision of placing a new opera house within the spectacular harbor, on the promontory of Bennelong Point. During early colonial settlement, this was the site of Fort Macquarie, designed by convict architect Francis Greenway and built in 1820. At the time of Goossens's arrival, the site was then occupied by the Sydney Tram Depot, a strangely castellated building that sought to evoke the earlier fortification.

Reluctance to lose the tram depot caused the Sydney City Council to consider nine different potential locations for the proposed opera house, most of which would have severely limited its architectural potential. Pragmatically, Goossens himself proposed an alternative location in Central Sydney at Wynyard Station, as closely located to the main transport hub as possible, while still ardently lobbying for an opera house being built at his preferred location on the harbor. As part of his campaign, Goossens commissioned his theatre set designer, William Constable, to make a watercolor illustration of what Goossens envisaged. Constable's illustration of Goossens's vision, proposed a building with allusions to art deco cinemas of the 1930s, combined with an outdoor amphitheater facing the harbor, that would have been highly exposed to the elements and quite impractical.

Intuitively from a very subjective appreciation of its dramatically visible location within the large expanse of Sydney Harbour, Goossens had selected Bennelong Point as the location of his desired opera house and for similar subjective reasons the Royal Australian Institute of Architects, gave their

unequivocal support to the choice of Bennelong Point, over all other proposed sites in the city.

The inherent significance of the site and its unique location is underpinned by its earlier importance to the local aboriginal population through many millennia. As the architect Peter Myers, who worked with Utzon on the Sydney Opera House, has described in his essay *The Third City: Sydney's original monuments and a possible new metropolis*, Bennelong Point was the site of a major aboriginal 'midden' or 'shell monument' with what is the present-day Sydney Harbour. According to Myers, "there are recorded sightings of shell monuments 12 metres high along the water's edge (equivalent to the height of the southern podium of Jørn Utzon's Sydney Opera House)" and speculates "how many thousands of years of gathering and accumulation went into their making?" (Myers, 2000, 81).

This midden and many others were appropriated by the British, following colonization, and burnt to provide lime for building construction, thus the building of the new city obliterated much of the evidence of the original city there. The British Navy's First Fleet had not brought building lime with them, presuming limestone would be readily available and anticipating construction in timber otherwise, but without expecting the damage that would be done by white ants. While without lime for construction, early brick and masonry constructions, according to Myers, did not last well and so the "middens" became a source of lime. As Myers states, "it is prescient that the first and largest shell kiln was on the eastern shore of Bennelong Point" (Myers, 2000, 81).

While it is a poetic notion that Utzon would have taken inspiration from the location of this significant midden monument as the inspiration; the origins of the roof "shells" have other sources of inspiration and are actually a rational, pragmatic, and fortuitously profound solution to the nature and location of the project. What is true is that Utzon without having visited Sydney saw in the limited black and white images of the harbor provided in the Sydney Opera House competition documentation and through his subsequent expert study of detailed maps of the Sydney Harbour, as had Goossens, the dramatic potential of the site. On a promontory projecting out into one of the great harbors of the world, and recognized it intuitively as an important place for people to come together.

Utzon did not consciously make a phenomenological enquiry of the site and did not critically consider the 'genius loci' of the place, in relation to the aboriginal presence in that particular place for millennia. Despite these critical shortcomings, he intuitively succeeded in capturing the significance in relation to the existing geographical, topographical, and urbanistic qualities of the site. Unintentionally he also managed to paraphrase original uses and practices of the place, and through his deep interest and knowledge in

vernacular architecture in non-Western societies he managed to produce a building that encapsulates these qualities.

UTZON'S POETIC CONCEPTUAL AND PHENOMENOLOGICAL INTENTIONS

Having realized that the site at Bennelong Point was located at the most prominent position within the overall harbor of Sydney and that the location could be viewed from various surrounding vantage points, Utzon determined that the building needed to be thought of as a three-dimensional sculpture. A building as sculptural object, where all sides, including the roof, the 'fifth façade,' were of equal significance that served as a landmark that would provide a central focal point for a harbor-oriented city.

The distinctive roof shells of the Sydney Opera House are invariably referred to as the sails by architectural writers and the general public alike, which given the maritime context is a most appropriate metaphoric association. However, there is inherent in their form, a less literal and more poetic transcultural tectonic reference, in that the shape of the roof shells echoes the hulls of the sailing boats Utzon's father designed, that had their inspiration in traditional Danish fishing boats, that in turn had evolved over time from Viking longships. The Vikings would often upturn their boats and use them as buildings, particularly when settling new lands, a poetic evocation of that sense of dwelling is what Utzon metaphorically realized with his design for the opera house in Sydney (Carter, 2016, 76).

The sail-like, hull formed roofs are what define the popular iconic silhouette of the Sydney Opera House, providing civic identity and an innate understanding of exactly where one is in the world. However, as the schematic competition drawings of the roof outlines indicate, they were not the most important concern in terms of driving the design of Utzon's proposal. For Utzon, as an architect for whom architecture is frame for human life, rather than an entity until itself, the underlying intention was to create an urban plaza. As a public gathering space; an outdoor room for the city and a grandopen-air amphitheater, with seating for many on the steps of a broad podium. The notion of the podium is the genesis of the Sydney Opera House. Utzon had the vision of people moving from the city, from the humdrum of their everyday lives, the normal lifeworld, toward the plaza of the opera house and then ascending the grand flight of stairs of the broad podium, similar to the Mayan temple podiums that had inspired him. As a sacred procession rising above the mundane, where the public are presented with the full panoramic grandeur of the harbor, before turning, suitably mentally cleansed

of everyday preoccupations and prepared for a life enhancing cultural experience, to then enter the cavernous and uplifting interior for a performance.

Like Louis Kahn, whose also poetically tectonic architecture, encompassed both the archaic and modern, Utzon sought to differentiate in the articulation of his architecture between what could be described as served and so-called servant spaces, with all rear of house functions located within the mass of the podium, below the auditoria. The podium being formed, as an evocation of a Sydney Harbour headland and a continuation of the local natural topography. While the performance spaces and other public areas are contained within the roof shells that seemingly float above the podium. The essence of Utzon's vision is expressed in his sketch of wind-blown clouds moving over the horizon. This poetic allusion to clouds was further enhanced by Utzon's use of matt and glazed ceramic tiles to clad the roof shells, but also with the intention to recreate the appearance of freshly fallen snow that Utzon thought would through association provide a cooling effect psychologically during hot Sydney summers.

The Sydney Opera House can thus be experienced and understood to embody Juhani Pallasmaa's understanding that "the timeless task of architecture is to create embodied existential metaphors that concretize and structure man's being in the world. Images of architecture reflect and externalize ideas and images of life; architecture materializes our images of ideal life. Buildings and towns enable us to structure, understand and remember the shapeless flow of reality and ultimately, to recognize and remember who we are. Architecture enables us to place ourselves in the continuum of culture" (Pallasmaa, 1994, 37). In this continuum of culture where we find ourselves at ease exists the *possibility* of being in a variety of ways, where architecture frames these possibilities and provides us with a tangible datum and authentic anchoring in the world. The postphenomenological notion of multistability opens up for a multitude of interpretations and practices, which for some are inscribed in the architecture by the architect and/or commissioner, others are created on site by users. These latter often transcend the original intentions by the architect, but are as valid and meaningful as the original ones. This counts for everything, man-made or not; intentionality is distributed in its multistability.

EMBODIED INTENTIONALITY

The Influence of Utzon's Maritime Background and Transcultural Sources of Inspiration

As a keen yachtsman, well versed in reading maritime charts, Utzon was able to fully appreciate that the Bennelong Point site could be looked down upon from

many surrounding natural vantage points around the harbor and from the harbor bridge; it thus became imperative for him to carefully consider the design of the roof or "fifth facade," as he considered it, as the major feature of the design. As a means, to contain within the building the unsightly ventilation equipment and other required installations needed. Also, Utzon's acute reading of the specific morphology of the Sydney Harbour basin, with its distinctive headlands and promontories, profoundly informed his design, uniquely according to its context. Rather than merely being an expressive architectural statement, "a magnificent doodle" as described by the Australian art critic Robert Hughes (Murray, 2003, 10) imposed willfully upon its site, rather Utzon sought with the design of the podium to emulate the local character of the sandstone headlands, that that rise gently, before falling sharply into the sea. The intention being to create a sense of the building as a continuous landscape from the nearby botanic gardens, up the grand embankment of stairs to a plateau, from which one could more fully experience the panoramic vista of this great natural harbor.

The idea of a building as a raised platform was a recurring theme in Utzon's work that was informed by the notion of architecture, as built landscape; as in the work of Aalto, with whom Utzon briefly worked early in his career, and who remained a great influence upon Utzon and many other architects. As Colin St. John Wilson has argued, Aalto was the leading architect of a poetic modernism, informed by nature and vernacular tradition that established "the other tradition of modern architecture" according to St. John Wilson (St. Wilson, 1995). The podium base of the Sydney Opera House was also directly influenced by Utzon's experience in 1949 of the pre-Columbian ruins at Chichen Itzá, Monte Albán and Uxmal, in Mexico. The great Mayan and Aztec constructions that he saw there, with their monumental stairs leading to immense stone platforms, made a profound and lasting impression upon him, establishing a defining principle in the design of many of his civic projects and most significantly in the Sydney Opera House.

Above the podium, the signature sail-like roof shells seemingly float. As envisaged by Utzon in his conceptual sketches, they should be like clouds hovering above the sea, but derive much of their architectural inspiration from Utzon's appreciation of ancient Chinese and Japanese temple roofs; that as in the Forbidden City in Beijing seem to float above a stone base. Unlike earlier modern architects and many of his contemporaries, Utzon's range of sources of inspiration and influences, the archē of his architecture, derived from a broad transcultural architectural thinking that went beyond the earlier conventional Western canon, but also owed much to his background, which was steeped in a craft tradition of wooden boat building, from which both his understanding of technē derived, but also his appreciation of nature as a source of inspiration and an openness to the diverse vernacular cultures of the world, as a source of contemporary inspiration.

As Frampton has commented, "Comparable in subtle ways to the protean achievements of Le Corbusier, Utzon's architecture emerges today as paradigmatic at many levels not least of which is the manner in which from the beginning of his career, he would totally repudiate the assumed superiority of Eurocentric culture" (Frampton, 2003, 6). Going beyond Utzon's broad openness to transcultural influences, from both nature and world culture, it is his poetic synthesis of archē, the origin or idea and technē, the bringing forth of that idea, that is most paradigmatic and exemplary in Utzon's work generally and the Sydney Opera House in particular. The archē can be seen in Utzon's extensive use of universally metaphoric sources of inspiration, as exemplified by his recurring inspirational motif of clouds hovering over the horizon (Carter, 2016, 135) and his reference to analogical sources of inspiration; often from nature, as a means to resolve the technē of his architecture, such as the inspiration from palm leaves in providing a structural solution to the design of the structural ribs that underpin and express the structure of the roof shells.

Certainly, Utzon is not unique in taking poetic inspiration and in finding technical solutions in nature, but what sets the Sydney Opera House and Utzon's subsequent work apart is the underlying geometric rational of its construction and eventual, seemingly expressively sculptural form. Utzon's original competition proposal did present a more parabolic form of roof shells and while he was keen to adopt the latest technologies, with the opera house being among the first buildings to use a supercomputer, to resolve its structural calculations, it was to no avail. As all resulting solutions proposed a secondary structural system supporting the roofs and Utzon remained committed to a clearer, integrated structural expression and construction, in terms of form and materials. Unlike in the work of Frank Gehry, who is often erroneously compared to Utzon, where the expressive sculptural external forms of his building do not have structural integrity in their own right; but are scaffolded and attached to hidden secondary systems of construction, allowing for a freer form of architectural expression. Whereas, with the Sydney Opera House, Utzon remained committed to a tectonic clarity of approach and as a result of the sheer scale and complexity posed by the realization of the Sydney Opera House, Utzon realized that he needed to resolve its construction through geometry and the use of as few replicated prefabricated components as possible. It is this implementation of geometric abstraction and the innovative use of existing technology to resolve his poetic vision, that is the basis for its enduring significance (Carter, 2016, 121). It is a work that is more than its distinctive outline, that tells of its making and embodies profound, multilayered experiential and transcultural narratives.

The Sydney Opera House stands as a testament to Heidegger's broader definition of technē, when he wrote, "There was a time when it was not

technology alone that bore the name technē. Once that revealing which brings forth truth into the splendour of radiant appearance was also called technē. Once there was a time when the bringing forth of the true into the beautiful was called technē. The poiesis of the fine arts was also called technē" (Heidegger & Ed. Krell, 1977, 315). Even though Don Ihde sees this as an overly romantic and nostalgic understanding of the relationship between art and technology, in writing his seminal publication of 1993 *Postphenomenology: Essays in the Postmodern Context* (Ihde, 1993, 105) there is in the Heideggerian definition of technē an emphasis on how things are revealed and brought forth into being, which the Sydney Opera is reflecting. The building does not just stand there, but it clearly articulates *how it got there and how it is there*. In the *Origin of the Work of Art* (1935–1936), Heidegger pointed at another quality that a similar building possesses: "The temple-work, standing there, opens up a world and at the same time sets this world back again on earth, which itself only thus emerges as native ground" (Heidegger, 1971, 41). The Sydney Opera opens up a variety and multiplicity of transcultural worlds and sits firmly located on the Bennelong Point.

TRANSCULTURAL TECTONIC SYNTHESIS OF ARCHĒ AND TECHNĒ UNDERPINS THE ENDURING PHENOMENOLOGICAL AND ICONIC STATUS OF THE SYDNEY OPERA HOUSE

As an architect, with a craft background and appreciation of ancient vernacular building traditions, Utzon was always concerned with processes by which his architecture would be made. For Utzon, there was a correlation between his appreciation of natural form and vernacular architecture, as with structures found in nature, vernacular building traditions have evolved and been refined over time. While greatly informed by historical architecture, Utzon's architecture eschews historicism and though incorporating universal modern technology, it avoids the superficiality of ubiquitous internationalization; through emphasizing the authentic use of materials and explicit integrity of construction, in very specific relation to the given context.

Utzon's Sydney Opera House preempted more recent developments in computer-aided design, industrialized prefabrication and construction. However, five decades on, it still illustrates the limitations of our present technologically driven developments in architecture. Design experimentations in digital fabrication, parametric design, and tensegrity structures may fascinate us technically, but do not necessarily satisfy our aesthetic, experiential, and existential needs as compellingly, as Utzon achieved with the Sydney Opera House. Our present digital tools are precisely that, merely tools; and Utzon

undoubtedly would have been among the first to employ such tools, were he still practicing; as evidenced by his enthusiasm to embrace and push the boundaries of the latest technology of his own time. However, to create any work of architectural significance and meaning requires the aesthetic, poetic, tectonic understanding of an architect. Despite the earlier ambitions of the functionalist movement and ongoing tendency, to create a precise, machine-like form of architecture, designed according to a very specific set of practical needs and using the latest available technology and more recently the similar aims of performance based and parametric design; there can be seen to be a deeper need for meaning and narrative in architecture (Carter, 2016, 138).

It can be clearly seen that Utzon's poetic and analytical appreciation of nature and world vernacular building traditions informed both the archē of his architectural visions and the technē of his approach to resolving the tectonic realization of his architecture. It is an outstanding transcultural synthesis of archē and technē, combined with an enthusiasm to embrace and utilize the latest developments within contemporary construction technology. It was, in keeping with Utzon's own professed personal credo of being, "at the edge of the possible." It is this remarkable and overarching synthesis that underpins the iconic status of the Sydney Opera House. That so eloquently defines a cultural break with the legacy of colonization and marked the emergence of Australia, as a dynamic, modern and self-confident, multicultural society.

In the following paragraphs, we shall focus our attention to recent uses and appropriations of the Sydney Opera as 'background' for digital projections of various character, and furthermore exemplify through similar media facades in architecture.

THE CASE: THE SYDNEY OPERA AS SITE FOR DIGITAL PROJECTION

On Tuesday October 9, 2018, a group of protesters, estimated at over a thousand, according to the Sydney Morning Herald, gathered at the Sydney Opera House, to vocally protest and actively disrupt the digital projection onto the sails of the opera house, of a commercial promotion of the Everest horse race, which with prize money of AUD13 million, then the world's richest turf race. With chants of "save our sails" and "it's our house" and shining torches and the lights from their mobile phones onto the emblematic roof shells of the opera house; using both older and more recent technology in their attempt to undermine the video projections of more powerful digital projection technology onto the iconic forms of the building. The protesters making clear their disgust at the crass commercialization and misuse of a

world heritage listed building and the most internationally recognized cultural symbol of Australia.

The direct-action torch light protest was supported by online petition that had been signed by more than 250,000 people, in a matter of a few days, as the fastest growing petition in Australia, denouncing the use of the Sydney Opera House as a giant billboard. In sharp contrast and opposition to the philistine comment of the Australian prime minister at the time, Scott Morrison, that the building is the "biggest billboard Sydney has" and with the unnuanced pragmatism of someone, who had previously been a managing director for Tourism Australia, suggested it should therefore be used for such purpose.

The last time signage on the Sydney Opera House had caused such international attention was back on March 18, 2003, in a time before powerful digital projectors, when two protesters against the U.S.-led invasion of Iraq, climbed to the top of the opera house shells and using a more traditional medium, painted the words "NO WAR" in large letters, using three coats of blood red color paint. The two individuals were later jailed for nine months of weekend detention for causing malicious damage to the building, but their act garnered widespread support, including from the building's architect Jørn Utzon, who sent them each an autographed photograph of the opera house.

Digital projections onto the opera house sails were established in 2007 and the first ever interactive, live imagery projection onto the opera house took place in 2010, to launch Generation One, a national campaign to end Indigenous disadvantage within Australia. At this event participants made hand prints in paint on a scale model of the Sydney Opera House, which was then filmed and projected live onto the actual building. Since then and with increasingly powerful projectors, located on the other side of the harbor, animated digital projections onto the northern sails of the opera house have become a regular and increasingly spectacular experience, most particularly as the signature feature of the annual 'Vivid Sydney: Light, Music and Ideas Festival,' which takes place during the longer hours of southern hemisphere winter darkness, between May and June. The varying artistic projections are invariably brashly colorful, often taking inspiration from Indigenous and other forms of abstract art or recognizable figurative motifs. Among the most precisely attuned to the form of the building and particularly impressive, was the work of 'Urbanscreen,' from Germany, who taking the actual architecture, its form and underlying structure, as their creative point of departure, developed video-mapped projections that created the illusion of the roof tiles rippling, as giant human dancers moved across its surface and the sea breeze billowed it surfaces like real ships sails and then, completely collapsing like falling curtains.

These various artistic projections have generally been very popular with the wider public, who have enjoyed the spectacle of this iconic building

seemingly coming into more vibrant life. These virtual decorations of the opera house have been less appreciated by others, such as the architects that worked with Utzon, but also those that appreciate the phenomenological qualities of its authentically tectonic structure, and that feel the pure beauty and integrity of the architecture is being demeaned, by such superficial and often garish ornamentation. For purists, Utzon developed the form of the roofs and the glazing of the tiles to reflect the nuanced changes in the natural daylight by day and moonlight by night, rather than artificial lighting and projections. As Louis Kahn commented with regards the luminous quality of the tiles "The sun did not know how beautiful its light was, until it was reflected off this building."

More than its iconic form and glistening reflective ceramic roof shell surfaces, it is one of the most profoundly phenomenological examples of modern architecture that embodies an array of transcultural inspirations and influences upon its architect, brought forth in terms of the tectonics and technē of its realization. While it poetically relates to its harbor context, through its evocation of maritime sail-like forms of the iconic shell roofs and local topographical features, of the characteristic Sydney headlands, as a raised platform ascended by a grand staircase; serving in a Heideggerian sense to gather the fourfold, of earth, sky, divinities, and mortals.

The examples of how the shells have been used as projection screen for digital art and advertisement show the multistability of technology, which always will transcend the original intentions of the maker. Utzon did not imagine that the white tiles and the form of the shells would one day be used in this way, even though he appreciated some of the appropriations made.

With the advent and widespread implementation of augmented reality, one could imagine a future scenario, where all buildings are reduced to being billboards for advertising of one form or another. The potential aesthetic benefit, that there would no longer be a need for physical hoardings and signage, so that by removing ones Google Glasses or such like, a pristine built environment would be revealed, unsullied by visual pollution, but where the authentic quality of that built environment, like the Las Vegas strip, becomes potentially secondary to the synthetic augmented version of reality. It is the task of a phenomenology of human–technology relations to not only "discover the various structural features of those ambiguous relations" (Ihde, 1990, 72) as Don Ihde suggests, but also to critically consider and interrogate the ethical and aesthetical consequences, technologies have on our perception and interaction with the lifeworld.

If postphenomenology is phenomenology plus pragmatism (Ihde, 2012, 128), as Don Ihde has suggested, and while technology in itself is neutral, the pragmatic use of technology is often, if not invariably driven by commercial gain or political advantage; then a most important role of a philosophy of

technology is to question the consequences to the existential quality of our lifeworld of overt pragmatism and the consumerist, neoliberal culture that underpins the pragmatic and invariably economically driven use of technology. Otherwise, postphenomenology, as the philosophy of technology like postmodern architecture, risks becoming complicit in furthering the neoliberal agenda.

Technology has always played an integral role in the creation and experience of our lifeworld. However, whereas previously technology was instrumental in creating physically real artifacts, that provided authentic phenomenological experiences. We have with the advent of digital visualization technologies, that create ever more compelling and realistic synthetic images, come to increasingly perceive the real world differently. The bright vivid digital projections onto the Sydney Opera House, irrespective of whether they have artistic intentions or more purely commercial motivation, serve to dull by comparison the real experience of the structure, despite its architectural brilliance and embodied synthesis of world culture.

Authentically meaningful, tectonically well-made architecture can stand the test of time, continuing to be appreciated and serving the ever-changing needs of society through centuries, even millennia. Until potentially becoming a picturesque ruin, that serves as a tourist attraction. While any integrated technology will date, become redundant, and fail within a very short span of time, without constant maintenance and regular upgrading. Media facades in architecture can seem innovative, futuristic, and Instagram friendly in the moment of their inception, but quickly seem dated, too pixelated, lacking in resolution and vibrancy, as each new iteration is superseded by increasingly more advanced technology. Toyo Ito's *Egg of Winds*, an elevated 16 × 8 meters ellipsoid form, clad with perforated aluminum plates, behind which were liquid crystal screens displaying moving images and information, was a noted example of an architectural media screen back in 1991. Located in an otherwise nondescript Tokyo suburb, it evoked Blade Runner-like visions of the future, of dirigible billboards, showing moving commercials, hovering in the night sky, but the *Egg of Winds* long ago ceased to actively function; becoming a meaningless, inanimate, equally bland object as the surroundings, it was intended to enliven and give identity to.

Media facades as structures are pragmatically, invariably more concerned with the image superficially presented, than the authentic tectonic integrity of the architecture that supports them, and in the light of day often a relatively underwhelming experience. The Dongdaemun Design Plaza (2014) by Zaha Hadid Architects in Seoul, designed as a hub for art, design, and technology, is a large sprawling sculpturally formed building complex that utilized the latest 3D digital design and construction tools technology in its realization. It is a manifesto for a digital technology driven, parametrically designed,

constructed and augmented architecture of the future. The varying curvature is clad in panels of minutely perforated aluminum panels and backlit, to allow for the surface to be a field of pixilation and an animated light show to transform the building at night. When it becomes a shimmering, ethereal object, like an alien spaceship hovering over the plaza. While, in the daylight the reality is more one of overbearingly monolithic form, curved concrete elements that are already crumbling, complex detailing poorly resolved and ill-considered interior spaces.

Certainly, while well-considered illumination can enhance and articulate the existing qualities of good architecture, it can also be used as a mask to hide the limitations and failings of poorly designed and constructed buildings. Like postmodernism, media facades in architecture owe their origins to the casinos of Las Vegas, with their brashly illuminated, garish simulacra of world architecture. Now, superseded by Macau, that combines bizarre fantasy architecture, with authentic historical buildings; and other similarly commercially driven, rather than culturally defined cities, such as Shanghai and Dubai, seeking to establish an international identity, through overt visual imagery.

The undermining effect that applied technology can have on the authentic experience of architecture can seem nothing compared to the negative environmental consequence of our reliance upon technology to regulate our indoor climate and illuminate our interiors, even in daytime, rather than design buildings according to climate and orientation, to naturally ventilate, keep warm through thermal mass and be well lit. However, if our built environment is to become an ever more synthetic, technologically augmented experience, we will become increasingly distanced from the natural environment, we need to maintain, also for our own existential well-being.

That so many protested the misuse of the Sydney Opera House suggests that there is still a strong human need to appreciate the authentic narrative of tectonic architecture and the veracity of matter, as Juhani Pallasmaa describes, mediated by technology. As Pallasmaa states in relation to the topic of ‘Sensuousness’ in his essay *Six themes for the next millennium*

> “We live in an era with a frustrating discrepancy and distance between the sensory experience of the world and the consciousness created by it, on one hand, and the biocultural responses accumulated in our unconscious reactions through millennia, on the other. Our relation to physical reality keeps weakening and we live increasingly in a world of dreams, in a stream of unrelated sensory impressions. It is the task of architecture to mediate between outer and inner realities that otherwise tend to depart from each other. It is the task of architecture to provide stable and reliable ground for the perception of the world, to provide the ground for a homecoming” (Pallasmaa, 1994, 77).

In conclusion, it can be understood that the profound and widely appreciated phenomenological qualities of such a significant work of architecture, as the Sydney Opera House, are not vague and subjective, just the result of the passing vagaries of popular opinion, but can be traced back to the embodied intentionality of its architect. That this can be explained by traditional phenomenological thinking; is due to a channeling by the architect of authentic experiences from elsewhere, an adherence to tectonic approach to architecture that makes explicit the narrative of its making and an openness to the use of technology, but only where it supported the tectonic integrity of the architecture. That new technology now exists and is becoming more ubiquitous, that allows for the overlaying of more superficial narratives, that can so radically affect the experience of the authentic artifact, to the point where the wider public become engaged in its defense, indicates that is an important role for postphenomenology to interrogate the motives and address the consequences of the postintentionality of subsequently applied technology. We need to be able to clearly differentiate between when the use of digital augmentation heightens our phenomenological experience; and when it is applied, like lipstick on a pig, in an attempt to improve or where it is an unnecessary and distracting gilding of the lily, of that which was more phenomenologically authentic and significant without digital augmentation.

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Part IV

THINGS

Chapter 8

Making into Thing—Anthropo-Eccene Design

On the Design of Emergence

Anders Michelsen

INTRODUCTION

This chapter presents reflections on the specific propensity, power, and perspective of designed artifacts in the broadest sense, objects, things, buildings, machines, infrastructures, technologies, materials, and so on—material, sensible, and symbolic artifacts; all the entities that may go into design as a produce of some sort of purposive action: what Ezio Manzini has termed an "artificial environment." In particular it is interested in how such an environment emerges as critical mass, as featured in debates on the Anthropocene. The chapter considers a proto-topology emerging in situations, interactions, and relationalities of the artificial environment that meshes critically with human cohabitation. In order to open the discussion, the chapter traces proto-topology back to issues of 'making into thing,' or "reification" (from 'res': thing, in Latin) from the nineteenth century to the second half of the twentieth century as a longue durée. The result, it is submitted, makes up a framework for thinking design anew. The chapter suggests three modalities of proto-topology—in situations, interactions, and relationalities—and concludes by coining the notion 'anthropo-eccene design.'

PROTO-TOPOLOGY OF ARTIFACTS

The call for this book emphasizes a new approach to the modern design idiom—something we may approach initially as a propensity, power, and perspective of designed artifacts as a continuous whole—in this broad sense

a continuum with a structure, thus a topology; material, sensible, and symbolic artifacts: *a proto-topology of artifacts*.[1] The prefix 'proto-' is used to connote that this is a tentative idea of topology which cannot (necessarily) be understood by the mathematical formalization most often associated with the notion of topology, but can be considered a culturally coproduced mesh of what I will term *situations, interactions, and relationalities*.[2] When Simon A. Lewis and Mark A. Maslin introduce the Anthropocene with the example that the "amount of concrete" produced throughout history amount to covering "the entire Earth's surface with a layer two millimetres thick" (Lewis and Maslin, 2018, 4) they display the utter complexity of this topology. On the one hand it does apparently not amount to much, a thin ephemeral layer, on the other this layer seems full of suffocating implications in the way it encompasses the world.

Such terms and language indicate that the emphasis is not on identifiable design such as buildings or urban plans, the entities that make up the modern design idiom, let's say from the Great Exhibition in Crystal Palace in 1851 onward, what Walter Benjamin would approach as "phantasmagoria" in *Das Passagen-Werk* (Benjamin, 1982, 49). The idea I want to propose has to do with a dynamic and complex system of matter that develops from what is and what may become. One radical example of *proto-topology* may be found in the project Biosphere II, an Earth Science Systems design in the outer shape of a greenhouse, built 1987–1991 in Oracle, Arizona, as a device for extraterrestrial living on Mars. One of several such steps toward space colonization, that is human habitation on other planets in the Solar System. Eight test crew members survived for two years in complete enclosure in the structure, what one of the self-proclaimed "biospherians" later called "an eco-laboratory" with a "mini-biosphere" (Nelson, 2018).

In the project the biosphere in question was designed by a synergy of multiple subsystems—at large and in detail, between living and nonsensible matter;[3] anywhere in the system, any time in the system. The project could be regarded as a designer version of the idea of "Gaia" inspired by postwar Earth-Systems thinking such as James Lovelock's Gaia-hypothesis which emphasizes how the biosphere comes together as a complex system (Lovelock, 2000). The most important aspect of this design was its self-organized and complex character: only if the system would work as emergent structure could it be considered a purposive success.

It was not a crafted object but a crafted system, on conditions laid out by a comprehensive bringing together of matter on a systemic foundation, as Kewin Kelly's account of the specialized bricolage used to design the synergy.[4] Or, from a different perspective, design of an actor-network resulting out of a hybridification (Bronu Latour) of modern design in multiple quasi-objects and quasi-subjects in all sorts of purification and translation,[5]

in reality only finalized when the biopherians stepped out of the system after two years enclosure. The project was perhaps most importantly a momentous effort defined by design of *situations, interactions, and relationalities*: from the total situation of the computer-controlled greenhouse structure enclosing the project to incorporated living elements such as humans and insects adapting to internal (and external) geography, biology, weather, and so on.

The Biosphere II was quite nonexemplary for the way design is still approached in many quarters. The issue of system, in particular in terms of self-organization, has been played down if not ignored in the modern design idiom in favor of a continuing focus on design as an ever more complicated yet still somehow *crafted work*. Crafted as a critical "crystal symbol[s] of a new faith" for the industrial world, as Walter Gropius wrote in the paradigmatic Bauhaus Manifesto in 1919 (Gropius, 1919). Modern design in fact often systematized craft approaches as seen in Bauhaus curriculum. But anything *systemic per se, that is, out of the systemic as a primary venture of self-organization*, was either directly incompatible or treated as mere support of processes, in particular when it comes to adapting aspects of complexity.[6] The recent interest in context and meaning does not change that. Klaus Krippendorff's manifestos for the 1980s and 1990s define design as "product semantics", or perhaps better, we may say design semantics, in the context of use and awareness in cognitive processes, which operate within intense and complex environments of artifacts, but never steps forward to the issue of emergence proper (Krippendorff, 1989).

Over the past decades changes have been made toward considering architecture as "agencies of assemblage, organization and deployment" (Sanford Kwinter),[7] inspired by poststructuralist theories of context, over distance involved with systems theory. Today system issues are also making indirect way through computing and design, from BIM to parametric design, visualization and 3D modeling, printing and prototyping, related Fablabs, and so on. Nevertheless, it may still be argued that significant features of design—of what design ought to become and result in—remain under the spell of a crafted work somehow, as Mies van der Rohe quipped "architecture starts when you carefully put two bricks together. There it begins" (Mies van der Rohe, n.d.).

The important question this book raises is whether proto-topology is a key demand in design for the twenty-first century; what I may tentatively paraphrase a 'craft of system,' or perhaps better a 'design of emergence' (Michelsen, 2007, 2009): that is, a way to think practices and purposive effects of systems that circumscribe objects and subjects of whatever type. When the editors of this book call for "multistability, mediation, critical reflection in construction processes and how architectural principles and processes can be translated and transferred into other technological domains where a certain kind of kinship is present" (Botin and Hyams, 2018), they

query situations, interactions, and relationality in more than one sense. One pertains to a different approach to description and analysis of design, another to a different method for thinking across disciplinary issues by translation and transferral. However, to this chapter, the most interesting is the implicit assumption of a new ontology of design by a 'design of emergence,' as effects of translation and transferral. I want to suggest that an important translation/transferral of the modern idiom has to do with a new ontology for design: what I term a *proto-topology of artifacts*. I will start my presentation in the critical debate on 'making into thing' originating in Marxist critique of mechanization of industrial capitalism in the nineteenth century and then indicate three modalities of such an ontology:

- Proto-topology in the sense of *situations* in Abraham Moles's "theory of objects" from 1972 (Moles, 1972).
- Proto-topology in the sense of *interactions* in Ezio Manzini's idea of the "artificial environment" from 1991(Manzini, 1991).
- Proto-topology in the sense of *relationalities* inspired by Felix Guattari's book *Chaosmosis* from 1992 (Guattari, 1992).
- Finally, I conclude the article by a brief debate on the Anthropocene and suggest a notion of 'anthropo-eccene design.'

MECHANIZED REIFICATION: TOWARD SYSTEMS

One, perhaps unlikely, point of departure for a proto-topology of artifacts is the idea of 'making into thing'—"reification" (of *res* = thing, in Latin) developed from the nineteenth century to the second half of the twentieth century by Marxism and critical theory. To "reify," can be written back to early Marxism and its focus on the development of a 'thingification' in industrial capitalism as a measure for how things articulate social relationships in the market cycle. Karl Marx described in his youth writings how the capitalist market economy turned human and social relations into a realization of things by the very same argument which early economists like Adam Smith embraced as industrial division of labor.[8] The worker produced goods by an organization that differed radically from traditional production's craft-mode,[9] but to Marx this was just a point of departure for the real change, the *treatment of the worker as part of an emerging system*.

The worker was in effect treated as a commodity through the exchange of object and labor, Marx argued, and thus systematically involved with the goods that s/he produced in the industrial system. Human relations were commodified in a wider sense, and this reification made its mark on industrial capitalism. Making into thing, was only provisionally a question of division

of labor, reification would become a penetrating social dimension where the subject was set as an object through the exchange of value. Marx wrote in 1844 about this system:

> the object which labor produces – labor's product – confronts it as something alien, as a power independent of the producer. The product of labor is labor which has been embodied in an object, which has become material: it is the objectification of labor. Labor's realization is its objectification. Under these economic conditions this realization of labor appears as loss of realization for the workers; objectification as loss of the object and bondage to it; appropriation as estrangement, as alienation (Marx, 1959, 29).

Marx pointed out that industrial capitalism, for the first time in history, made exchange of matter an issue of reification under a *systemic condition* coconstructive of labor. This he termed "*a loss of object and bondage*"; an "appropriation as *estrangement*, as *alienation*." The worker became a thing in ways he or she could not relate to. An uncanny position which in the nineteenth century was physically destroying the working class in the extremely unhealthy environments of early industrialism.

After rebellions throughout the first part of the nineteenth century by early worker organizations as The Luddites, or the revolutionary wave across continental Europe in the mid-nineteenth century, a new framework was found in the workers movement. The industrial system might be changed from within (famously theorized as dialectical and historical materialism by Marx). Either by reforms, or by transcending it in the promise of a communist revolution, the two major positions of worker politics up to the October Revolution in 1917. Until World War I in 1914, this development went along with an expanding industrial production involving new sciences such as chemistry and medicine, and taking part in nineteenth-century imperialisms as "the Scramble for Africa" between the 1880s and World War I. World War I would further prove that systems were able to pervade human life in almost any possible measure, described as a new "landscape" by the young Kurt Lewin in 1917 (Lewin, 2009).

In later writings, *The Capital*, Marx would famously leave his emphasis on humanism and develop one of the first approaches to a critique of the political economy of exchange and use value as a system per se, turning real material relationships into abstract value—the so-called real abstraction—a cycle further emphasizing the implications of the reification thesis. In the interwar period, György Lukács, part of the revolutionary movement in Eastern Europe following the October Revolution, wrote that reification should be regarded not merely as a social dimension of capitalism but also a systematic form of consciousness, 'a phantom objectivity.' Lukács wrote,

> The essence of commodity-structure has often been pointed out. Its basis is that arelation between people takes on the character of a thing and thus acquires a 'phantom objectivity', an autonomy that seems so strictly rational and all-embracing as to conceal every trace of its fundamental nature: the relation between people (Lukács, 1967, 1).

The reification of the capitalist system would expand mechanically, economically, and socially. From the mid-eighteenth to the twentieth century it would become a system without boundaries, as witnessed by critical theories from Karl Marx's *Paris Manuscripts* (*Economic and Philosophic Manuscripts of 1844*) over Lukács to Theodor Adorno and Max Horkheimer's lambast of capitalist "culture industry" in 1944 (Adorno and Horkheimer, 1944). In a recent revision of critical theory, Axel Honneth argues that reification is now a deep-seated feature of cognitive, interpersonal relations:

> In the constantly expanding sphere of commodity exchange, subjects are compelled to behave as detached observers, rather than as active participants in social life, because their reciprocal calculation of the benefits that others might yield for their own profit demands a purely rational and emotionless stance.

Reification had moved from a matter of fact to a matter of system—from artifacts coming out of factories to a subjugated and empowered, or "administered world."[10] Industrial modernity had effected a grand parallel of tool and use, craft and artifact, produce and producer—organic and mechanical systems—pervading everything, illustrated by Marx's and Engel's claim from Manifesto of the Communist Party that "All that is solid melts into air." (Marx and Engels, 2004 [1848], 16). This theme would move on in ever new formats, expanded into critical approaches in the 1960s and 1970s such as Michel Foucault's critique of biopolitics effectuated by the "multilinear ensembles" of discipline (Deleuze, 1991, 159ff) in asylums, prisons, barracks, hospitals, schools, and so on.

LES ÊTRE-MACHINES: ONTOLOGY

With the invention of the digital computer from the late 1930s to the early 1950s new ideas about mechanical–physiological "cybernetics," put forward by the founder of Cybernetics, Norbert Wiener (Wiener, 1991 [1948]), brought reification into a new logical and scientific field reenvisioning Western thought as system.[11] Manfred E. Clynes and Nathan S. Kline wrote in connection with a NASA program the article "Cyborgs and Space" in 1960 on the possibilities of transforming humans into a new kind of man–machine, "artifact-organism systems", the socalled cybernetic organism, or 'cyborg' which would survive in outer space: "man's bodily functions to

meet the requirements of extraterrestrial environments would be more logical than providing an earthly environment for him in space" (Clynes and Kline, 1995, 29). This approach would reduce any idea of reification to a new kind of technology built on systems in more than one sense, and end the modern schism between the "two cultures" of humanities and science, bridging "matter and data"; "behavior, sensation and thought, with interpersonal relationships, with language, with learning processes," *with* "material objects" as the German computer art pioneer Herbert W. Franke wrote in 1999:

> In Cybernetics's "Gründer Jahre" from 1950 onwards, it looked as if a sluice was opened, and a variety of phenomena were discovered where both matter and data was involved, which previously had been difficult to compare. At that time, it was primarily the philosophers who dealt with non-material relationships, which were also called consciousness. To the objects that cybernetics could handle, belonged all the devices of communications technology, control techniques and computer technique. But from the start, Norbert Wiener includedbiological and social processes in the relevant area of cybernetics—all that has to do with behavior, sensation and thought, with interpersonal relationships, with language, with learning processes. And on this basis, a vision arose: cybernetics should be the equivalent of the science that apply to material objects—what one normally attributes to physics—a general science that merged all sciences that target information processes. (Franke, Kybernetik)

At the beginning of the 1960s, the issue of 'making into thing' had moved *reification from a target of critique to an ontological problem*. The computer was the most complicated artifact in the history of technology, and it seemed to spur a new promiscuous ontology which no longer stopped short at the schism between man and machine.[12] It was a pervasive system of design, seemingly without boundary. A universal machine, bur paradoxically also the result of purposive action. In the latter part of the twentieth century, notions would emerge that would embed the term system in a broadly fledged amalgam of situations, interactions, and relationalities, in part designed, in part observed, and in part designed by observation, and so on. Ludwig von Bertalanffy wrote in *General System Theory: Foundations, Development, Applications*, published in 1968: "It is necessary to study not only parts and processes in isolation, but also to solve the decisive problems found in organization and order unifying them, resulting from dynamic interaction of parts" (von Bertalanffy, 1968, 31).[13] To understand "parts and processes" would in consequence also be to understand "organization and order unifying them, resulting from dynamic interaction"; of a human, a machine, a society, an economy, and so on.

Edgar Morin describes in the mid-1970s "machinic Beings" which he terms "les être-machines" [machinic Being]—in *La méthode. La Nature de la Nature*

(Morin, 1977). Machines are attributed a "poietic" stance with explicit reference to system theory, allegedly a potential to create itself somehow (mirrored in systemic notions such as negentropy, synergy, emergence, bifurcation, dissipative structures, autopoiesis, and so on)[14] that has been with us since:[15]

> We have been captives of the idea of mechanical repetition, of the idea of standardized fabrication. The word machine must also be "given" the meaning we find in pre- or extra-industrial signification, where it designates the set or complex agencies [agencements] where the market is both regulated and regulating: . . . the political machine, the administrative . . . It is necessary above all to give it meaning in its poietic dimension, as a term which in the machine connects creation and production, praxis and poetry. . . . In the machine is found not only the machinic [le machinal] (the repetitive) but also the fabrication [le machinant] (the inventive) (Morin, 1977, 160–61).[16]

PROTO-TOPOLOGY AS *SITUATIONS*

The poietic potential of machines—of pre- or extra-industrial signification, says Morin—is not only typical for the aspiration of system theory in many different versions, not least when allied with design of, for instance, artificial intelligence and robotics. It is another way to argue that the main purpose of design is not a crafted work but effects of organization which can be designed in the capacity of what goes into it (as we saw in Biosphere II). There are no crafted objects, with which 'all begins' as van der Rohe thought; the object becomes a node or a pinpointed element, a hybrid in the terms of Latour; a function of something which extends a proto-topology of artifacts as element of a continuum. The Being of design can be defined as a Being of systems, that is, purposive endeavors. "To design is to devise courses of action aimed at changing existing situations into preferred" argues Herbert Simon, whose career (systems thinking, artificial intelligence, design, organization, administration, economics) informatively complemented this development (Simon, 1988, 67).

One interesting way of detailing this can be found in the today forgotten book *Théorie des objets* by the cybernetic sociologist Abraham Moles (Moles, 1972).[17] Moles presents ideas which feed productively into what we have termed a proto-topology of artifacts which he describes as *situations of usage and structure* of "the object, universal mediator, revelator of society":

> This is the problem of the object, universal mediator, revelator [révélateur] of society by way of the progressive denaturation of the latter, constructor of the everyday environment, the system of social communication, surcharged with values which cannot be handled by the past [qu'il ne le jamais par le passé], and

> reflecting the anonymity of the industrial production. Thus what we have poses primarily as a notion of an environment, a phenomenological sphere surrounding the individual, by which is successively conveyed the message of the Other or the others. The stature of society becomes reduced in the personal perception to a simple factor of the environment. (Moles, 1972, 8)

In Moles's perspective the object stands forward in a double manner of physical environment and phenomenological sphere assuming status of "universal mediator"; a "constructor of the everyday environment" emerging with the "the anonymity of the industrial fabrication" effectively pervading everything. In Moles's formula, "(. . .) the object is thrown against our eyes and our senses, it is a barrier and a reality." It is "an inventory of fundamental zones for the realization of being [réalization de l'être]" (Moles, 1972, 9) consisting of a "triple inventory":

- Situational translation between organism and environment.
- Penetration of an environment by an order of mediators.
- Formal rationality captured by statistics; measured by numerical entities.

Moles presents a two-dimensional diagram—a coordinate system with an x-axis and a y-axis—a "schematic diagram for the world of objects" (Moles, 1972, 20) composed of situations where objects function as universal mediators, with cases such as "radio receivers," "automobiles," "IBM 704," "the human brain". The diagram can be read as outline of a proto-topology of artifacts by situations—each relating function and structure, from violins to mainframe computers, even on to the human brain (in the diagram designated the "Cerveau humain?").

Moles diagram establishes correlations between what he terms a structural complexity ("the ensemble of assembled singular elements"), annotated at the x-axis and a functional complexity, annotated at the y-axis ("a statistical dimension of usage"). The resulting situations are further annotated by applying a logarithmic scale. The result is a model which rationalizes a range of designs. The diagram orders "technological organizations" (Moles, 1972, 20) in a continuum "expressed in binary digits."

The correlation of usage and structure does not amount to a mathematization proper. It is a heuristic alignment of formats of usage to formats of organization composed out of function and structure. Out of this is indicated combinatorics tentatively expressed by digits to emphasize the growing complexity of a continuum, common for instance, for violins and computers. In that sense an early draft of what will be made instrumental to a fuller extent in Biosphere II. The increasing complexity of the diagram allows for indicating, for instance, the situation where a computer may simulate the function albeit

not the structure of the violin (albeit with 3D printing the violin is not beyond computational production).

The diagram indicates how a proto-topology of artifacts can be initially modeled albeit it says little about interaction as such (beyond indicating that such could be) and almost nothing about relationalities, for instance, in the sense of Biosphere II. One may consider it bound by an era where the notions of complexity were relatively new and not really operational, compared to today. Moles argues that the diagram presents complexity as an "inherent property of a combinatorial universe comprising (. . .) of dimensions, by which the individual discover new points of view on the external world" (Moles, 1972, 28).

The objects displayed in the diagram—"radio receivers," "automobiles," "violins," "playing cards," "embroidery," "IBM 704," "the human brain"—are turned situations, defined by usage and structure, states of combination, where "the total is larger than the sum of its parts." Moles translates the idea of a distinctive design object (with form and function) into "essential dimensions" (Moles, 1972, 29) effectuated *by and in* a "world of objects" mapping a continuum of situations in a proto-topology of artifacts. He writes, "structural complexity and functional complexity are the essential dimensions of organizations [organisms], that allow for mapping a topology larger than the sum of its parts" (Moles, 1972, 29):

> The concept of complexity is therefore essential for the technical civilization, since Homo Faber is displaced little by little in its role of fabrication of singular objects; the tool, the instrument, towards the idea of the agency or the combinatory of simple parties, elements, wherein the proprieties exceed that of the elements: the total is larger than the sum of its parts. (Moles, 1972, 32)

PROTO-TOPOLOGY AS *INTERACTIONS*

Moles's sketch not only transforms a notion of reification almost beyond recognition, but also outlines the totality of a continuum "surcharged with values which cannot be handled by the past":

- Reification can be regarded as combinatorial universe transferring objects to a situated proto-topology of artifacts in terms of function and complexity.
- The idea of two cultures, related for instance by a kind of reification, to a dynamic system of sensible options defined by designed emergence.
- Reification is replaced by a complexity of "essential dimensions" (Moles, 1972, 29) in a continuum.
- This is ontologically supported by the heuristic of numbers.

There is no doubt that Moles, like Morin, commits to the heady system-optimism running from the 1950s to the 1970s, and further till today. But at the same time, it opens for understanding the totality of multistable, mediated, and reflective design formats engendering new systemic definitions and kinships of the sort we see in Biosphere II. These are multiple and inscribed in all sorts of creation, organization, and production as well as marketing, consumption, living, and recycling of design.

We may take any possible sample of design and find a variety of systemic traits. We may, for instance, redevise the contemporary fashion industry to situations, interactions, and relationalities; from logistics and supply chains to marketed forms, disseminating in experiential, affluent cultures all over the world. From cotton fields in Uzbekistan, over garment factories in Bangladesh to Karl Lagerfeld couture or H&M stores in Miami, further to fashion bloggers, celebrity media, and the individual user hanging on to trends by showing off in pics and pranks on Instagram and Snapchat. Despite downsides to the spectacle—for workers and producers of raw materials and goods in the developing world, or sustainability, or with regard to the climate crisis—we may see modes of situations, interactions, and relationalities; multistable, mediated, and reflective design, which work as a continuum in huge as well as minor formats.

Such an aggregation of systems is the departure for Ezio Manzini's *Artefacts. Vers une nouvelle écologie de l'environnement artificial* [Artefacts. Towards a new ecology of an artificial environment] from 1989 (Manzini, 1991). Manzini argues, "For man, the artificial is a completely natural activity," but Manzini goes on, nonetheless, this activity appears as a paradoxical "unknown artificial world that we must explore to learn its qualities and laws" (Manzini, 1991, 44, 52).[18] The book works this paradox as a new field of design by the introduction of an ecological metaphor. Manzini speaks about a qualification of the two traditional opposites between the artificial as either a "unitary project" of human origin, and a domain produced "in an autonomous manner concordant with laws which have nothing to do with our choices" (Manzini, 1991, 103–4). Systems develop in a double sense of multiple trajectories in what becomes an ecology:

> Any artifact, any image, any idea retains some logic, values, sensibility, from those who have conceived of, designed and produced it. However, any of those take their point of departure in a dynamic system which is much larger and more complex: a system where equilibria and disequilibria (and thus final qualities) depend on conflicts and connective [reports] strengths which develop between the subsystems and their different parts, where each fight to defend their proper existence within the limit. (Manzini, 1991, 104)

This use of an "ecological metaphor" can be understood as a continuity which is composed by relationalities with "equilibria and disequilibria (and

thus final qualities)" depending on interactions of "conflicts and connective [reports] strengths which develop between the subsystems and their different parts" (Manzini, 1991, 104).

This is metaphorized an environment, but the metaphor in reality covers a broad spectrum which comes together in a new way. The environment may be natural, artificial, organic, mechanic, sensible, nonhuman, human, nonsentient, sentient, living, nonliving, and so on. If at pains to see where nature is positioned, it appears as fully fledged in Manzini's outline, within "a system where equilibria and disequilibria (and thus final qualities) depend on conflicts and connective [reports] strengths."

The metaphor of ecology is more than a discrete model: the systems that Manzini envisions may correlate by multiple interactions, by bumping into each other in endless ways, by exchanging, mixing, and hybridizing; by surprise, correspondence, and so on. That is, not only translating and transferring by a dynamical and ongoing establishment of situations, interactions, and relationalities but effectuating a different realm, a different Being.

PROTO-TOPOLOGY AS *RELATIONALITIES*

In the 1980s, another interesting treatise indicates an even more dynamic approach to proto-topology over a broader range of material, sensible, and symbolic artifacts, as the produce of 'assemblages'[19] indicating fluidity and change, connectivity and networks, changeability and interaction. In Gilles Deleuze and Felix Guattari, *A Thousand Plateaus, Capitalism and Schizofrenia* (Deleuze and Guattari, 1987, 4), assemblages can be said to be manifested forms of Being which aggregate self-organization. In the introductory chapter about the "rhizome," the authors write:

> The multiple *must be made,* not by always adding a higher dimension, but rather in the simplest of ways, by dint of sobriety, with the number of dimensions one already has available—always $n-1$ (the only way the one belongs to the multiple: always subtracted). Subtract the unique from the multiplicity to be constituted; write at $n-1$ dimensions. A system of this kind could be called a rhizome. (Deleuze and Guattari, 1987, 6)

The multiple is a produce of what is famously termed the "abstract Machine" that "does not function to represent, even something real, but rather constructs a real that is yet to come, a new type of reality" (Deleuze and Guattari, 1987, 142). In our context this "multiple" that "*must be made"*—not by "always adding a higher dimension" but by being specific about the effect of the existence of multiple virtual dimensions to be actualized $n-1$

dimensions—can in fact be detailed as something with a multiple potential (the "n"), but also specified somehow ("−1"): what I call 'situations.' The specificity of n−1 dimensions, 'interactions' between n−1 and n−1 dimensions, and relationalities which can be said to couple n−1 and n−1 dimensions.

It is thus a specification of situations, interactions, and relationalities which can be seen as effectuation of self-organizations and abstract machines. Multiple effectuations and effect, across, let's say, material, sensible, and symbolic artifacts.

This can for our purpose be further detailed by introducing Felix Guattari's last book, *Chaosmosis* from 1992 (Guattari, 1992), which may be read as a proto-topology emphasizing a dynamic of relationalities by highlighting the metaphor of the "machine." Guattari submits to this end a notion of machine (already in play as the abstract machine in *A Thousand Plateaus*); "Common usage suggest that we speak of the machine as a subset of technology. We should, however, consider the problematic of technology as dependent on machines, and not the inverse. The machine would become the prerequisite for technology rather than its expression" (Guattari, 1992, 33).

The machine is seen as a poietic Being, an ontological category for the creative production of proto-topology that enables artifacts as technology of subsets, that is, prerequisites for technology.[20] For Guattari " (. . .) the necessity of expanding the limits of the machine, *stricto sensu*, to the functional ensemble which associates it with man must take into account "multiple components" (Guattari, 1992, 34–35):

- "material and energy components
- semiotic, diagrammatic and algorithmic components (plans, formulae, equations and calculations which lead to the fabrication of the machine); components of organs, influx and humours of the human body;
- individual and collective mental representations and information;
- investments of desiring machines producing a subjectivity adjacent to these components;
- abstract machines installing themselves transversally to the machinic levels previously considered (material, cognitive, affective and social)."

According to Guattari, the machine is thus a multiple of functional ensembles which brings into relation "multiple components." He argues that it will always depend on "exterior elements in order to be able to exist as such. It implies a complementarity, not just with the man who fabricates it, makes it function or destroys it, but it is itself in a relation of alterity with other virtual or actual machines—a "non-human" enunciation, a proto-subjective diagram" (Guattari, 1992, 37). Put differently, if we substitute artifacts for

technology. we start to get an idea of what radical relationalities a proto-topology of artifacts may involve, not only in terms of design, but in terms of design and other parts of Being. Guattari argues that the machine is radically relational; it is defined by its "alterity with other virtual or actual machines"—a relationality larger than the sum of its parts, but also an emergent surplus which is specific, in terms of organs, "influx and humors of the human body," or individual and collective, mental representations, information and desire.

We no longer have a combinatorial universe of situations annotated logarithmically, or systems in ecological interaction, but a new domain of self-organization defined by everywhere present dynamics along lines of the rhizome. A radical relationality with material, sensible, and symbolic artifacts, living and nonsensible entities, desiring and subject-producing effects—machines in a continuous process of objective alterity with other virtual and actual machines (Levy, 1997).

ANTHROPO-ECCENE DESIGN

One important inspiration for my considerations—the reader has already guessed, I think—is an interest in addressing what is now termed the Anthropocene.[21] In the carefully argued overview of this quite recent notion (referring to issues long in the making), Simon A. Lewis and Mark A. Maslin argue, "although many people use the Anthropocene as a synonym for climate change or global environment change, it is much more than these critical threats. People began to change the planet long ago, and these impacts run deeper than just our use of fossil fuels . . . . The Anthropocene . . . . [encapsulates] all the immense and far-reaching impacts of human actions on Earth" (Lewis and Maslin, 2018, 6).

As indicated in my argument above, design of systems is a major contributor as well as effect of proto-topology. Lewis and Maslin argue that "energy and information" define human societies[22] but in fact they talk as much, or more about organizations as effectuated by matter, even in ways which emphasize situations, interactions, and relationalities, as for instance manifested when "human societies" are seen as "complex adaptive systems" (Lewis and Maslin, 2018, 332ff). In particular it runs through their account that practice and purposive action is a key denominator.

The idea of the Anthropocene has not remained unquestioned. And perhaps it is interesting to sharpen our idea of a proto-topology of artifacts by involving two forms of critique of the Anthropocene.

One disseminates from the long-standing interest to question the order of discourse by critique, that is, the given relevance, origin and set of implications related to a notion such as the Anthropocene. In the book manuscript *The End of Man: A Feminist Counterapocalypse*, Joanna Zylinska questions the

hypothesis of the Anthropocene. Drawing upon a number of critical thinkers, in particular feminists, she debates a genealogy of cultural catastrophe and its involvement with power; "The Anthropocene is . . . a story about a presently unfolding planetary emergency that affects both rich and poor regions of the world—although not all of them with the same impact or intensity. Yet it is worth pointing out that the apocalyptic tropes that underpin the Anthropocene narrative have actually been reoccurring through Western (and non-Western) cultural history" (Zylinska, without year and publisher, 4). In particular, one important aspect is the relation between the idea of the Anthropocene and what she terms an "apocalypse habit" narrated by a patriarchal trope, "Man's tragic worldview" (Zylinska, without year and publisher, 7):

> Ultimately, the goal of the book is to break what Keller has termed "an apocalypse habit." This habit manifests itself in a "wider matrix of unconscious tendencies" that shape finalist thinking, with its moralistic underpinnings, whereby moralism comes at the expense of the analysis of power relations on the ground. (Zylinska, without year and publisher, 7)

Zylinska takes issue with Man's tragic worldview as something particular for patriarchal sentiments and argues interestingly for how the obsession with global and planetary reach is characteristic of male entrepreneurs such as Elon Musk. It espouses a dramatic and fetishistic alignment of catastrophe and male dominance which seems to be set on creating a new domain of (male) civilization off the planet Earth. The "desire" to "*take life to Mars*, in the form of human cargo" (Zylinska, without year and publisher, 22) becomes what she criticizes as "CGI space porn of the highest caliber" (Zylinska, without year and publisher, 23). Zylinska is concerned that a patriarchal catastrophe-scenario in reality has little to offer underprivileged—all the people worse off in globalization processes—and needs to be counteracted by a "feminist counter-apocalyptic framework."[23]

From quite another quarter, the critic Timothy Morton, inspired by OOO and speculative realism, has criticized the Anthropocene for being out of touch with the real issue of climate change, which he specifies by object of global warming seen as a "hyperobject" that spells the "end" of the phenomenological, cultured world distanced from nature and installed by purposive actions of man.

What transpires with the climate changes is a new crisis which cannot be operated on because it is "on a planetary scale." The ontological dichotomy of culture and nature is replaced by a situation—a "waking" says Morton—"inside an object" (Morton, 2013, 119) which cannot purposively be distanced. The hyperobject renders the human inoperative; it operates on the human as ontological quick sand; "Thinking on a planetary scale means waking up inside an object, or rather a series of "objects wrapped in objects": Earth, the biosphere,

climate, global warming."[24] The situation is "spooky, uncanny" (Morton, 2013, 130)—the "end of the world." (Morton, 2013, 99ff). Morton goes on:

> A hyperobject has ruined the weather conversation, which functions as part of a neutral screen that enables us to have a human drama in the foreground. In an age of global warming, there is no background, and thus there is no foreground. It is the end of the world, since worlds depend on backgrounds and foregrounds. *World* is a fragile aesthetic effect around whose corners we are beginning to see. True planetary awareness is the creeping realization not that "We Are the World"; but that we aren't. (Morton, 2013, 99)

To design a hyperobject is a calamity because it situates an unbearable coexistence without perspective, distance, and objectification, "coexistence is in our face: it *is* our face. We are made of nonhuman and nonsentient and nonliving entities. It's not a cozy situation: *it's* a spooky, uncanny situation. We find ourselves in what robotics and CGI designers call *the uncanny valley*. It's a commonly known phenomenon in CGI design that if you build figures that look too much like humans, you are at risk of crossing a threshold and falling into the uncanny valley . . . In the uncanny valley, beings are strangely familiar and familiarly strange" (Morton, 2013, 130).

* * *

Apparently our introduction of a proto-topology of artifacts may come under fire from two quite different camps. To one side, discourse critique stipulates that any proto-topology of artifacts runs the risk of taking part in a patriarchal catastrophe discourse; to another side it runs the risk of taking part in a neglect of inaccessible realism.

To debate this, we may close with a transformative counter-image to Biosphere II in terms of proto-topology, that is, as an indication of what I metaphorized as a 'design of emergence.' Let us in closing take a brief look at the remains of the catastrophic accident in 1986 in Chernobyl which destroyed a nuclear power station in the Soviet Union (now Ukraine). The catastrophe left an entire region uninhabitable as "radioactive wasteland" and led to removal of 120,000 people from an exclusion zone 30 kilometers in diameter, including the "800-year-old town of Chernobyl, dozens of villages, and even a top-secret Soviet military base" (Oliphant, 2016). There is still no real account of deaths (or health implications) of the catastrophe which left the area deserted as a wasted postanthropocene zone. However, what is interesting to our approach is that the ghostly and uncanny in a sense utterly destroyed area is now coming to life with animals returning and tourists (!) entering.

Press reports describe new life (Oliphant, 2016) and relates to interesting new research in life forms prospering on radioactivity.[25] First, the catastrophe had all the ideological feats that is today discursively criticized in the debate on the Anthropocene; the area was deemed irreparable and closed off, while now it seems that life may go on. Second, it shows significant traits of the Anthropocene as described by Lewis and Maslin, with clear features of a complex adaptive system, with emergent feats. Third, the accident shows a concrete example of what might actually be the stature of a real hyperobject—"spooky, uncanny"—the "end of the world."

But perhaps the example also shows the limits of discourse critique versus speculative realism. On the one hand, limits of a motivated discourse critique, on the other, limits of the notion of a speculative reality presented with a claim of compelling relevance. Both approaches miss at least one germinal aspect of what I have discussed in this chapter *as design*: a creative and purposive action of emergence, that is, a certain category as domain and effect.

In both discourse critique and speculative realism there is a denial of an implicit creativity carved out by developing proto-topology. Either because this is seen as less important to narratives and their power, or because it is incongruent with speculative ideas of reality proffered by global warming. Perhaps the issue of catastrophe versus hyperobject might do with a specification of some sort of human or organic—even posthuman creative element? In Chernobyl comprising the unmistakenly element that goes into the revival of life in an area thought to be wasted. A design of emergence 'post' disaster, perhaps less fashionable than the Californian high tech of Biosphere II but no less important, and perhaps closer to a real "feminist counter-apocalyptic framework"?

Zylinska seems to reduce such an aspect to the reiteration of tropes as any other discourse critique. Her interest in the precarious re-address what kind of action may be needed, but it is not clear how this affects her critique. Morton, following Graham Harman and other's "theory of everything" (Harman, 2018), fetishizes the object beyond modern correlationism as exclusive of action beyond acknowledgment (in OOO also an object potentially out of grasp)—and we may in fact still have to query 'what' reality the 'work' of OOO is somehow posited in.

Most important our concluding case and my portrait of a proto-topology of artifacts as a new ontology for design does not really leave out any of the two, ideological critique versus speculative novelty. Take Moles's argument above, both are there. But the idea of a design of emergence opens another perspective, I would like to argue. How is it possible to adopt a responsibility along with critique of the Anthropocene beyond nonaccessible hyperobjectivity, or strategic deliberations of discourse?

The Chernobyl case teaches us the need for critique as well as acknowledgment of reality. It shows life inside hyperobjects with a critical stamina, in the

radioactive wasteland. If this may be a signature of human finitude it is also a witness of virtuality. There is plenty of translation and transferral—with reference to the call of this book. Perhaps of the kind put into words at the breakthrough of system theory in the 1950s by Maurice Merleau-Ponty when he called for a revision of certainties pertaining to man:

> Our contemporaries have no difficulty thinking both that human life is the demand for an original order and that this order could not possibly endure or even truly exist except under *certain very precise and very concrete conditions which can fail to materialize*, no natural arrangement of things and the world predestining them to make a human life possible. (Merleau-Ponty, 1964, 225–26)[26]

With this I will close with a recommendation of design not for the Anthropocene, but a design of emergence for the anthropo-eccene.

NOTES

1. Cf. my recent books Dinesen et al., (2017), Engholm and Michelsen (2018), and Michelsen (2019).

2. One way of thinking topology in thus way is found in the heritage of structuralism defined as an issue of topology, as discussed by Gilles Deleuze in "How do we recognize structuralism" from the late 1960es. He here defines structure as "not a matter of a location in a *real* spatial expanse, nor of sites in imaginary extensions, but rather of places and sites in a properly structural space, that is, a topological space" (Deleuze, 2004, 174). What I am interested in more technically is, whether it is possible to 'flesh out' such places and sites as objects in a continuum of matter—as the artificial, as artifacts; that is, as a topological space of matter, or perhaps "assemblage" as argued by Manuel Delanda? Could we think of design as an ordered practice of mattering today present in another sense of the term 'model' than the one found in classical structuralism that Deleuze writes from; in part as effects of a diversity of models materializing throughout the twentieth century as material, sensible and symbolic artifacts? (see also Delanda, 2016).

3. See Kevin Kelly's account in (Kelly, 1994, 133ff). See also the Biosphere-project's website, *The University of Arizona, Biosphere II*. http://biosphere2.org/ (accessed 31_05_2019:14.46).

4. See note 7.

5. Cf. Bruno Latour's definition:

> "The hypothesis of this essay is that the word 'modern' designates two sets of entirely different practices which must remain distinct if they are to remain effective, but have recently begun to be confused.
> The first set of practices, by 'translation', creates mixtures between entirely new types of beings, hybrids of nature and culture. The second, by 'purification', creates two entirely

distinct ontological zones: that of human beings on the one hand; that of nonhumans on the other. Without the first set, the practices of purification would be fruitless or pointless. Without the second, the work of translation would be slowed down, limited, or even ruled out" (Latour, 1993, 10–11).

6. This despite important challenges from the perspective of, for instance, HfG Ulm in the 1960s, the methodology debates at the same time, or 1970's visionaries such as Superstudio or Archigram (see, for instance, Sadler, 2005). A de facto lone voice of a system approach in design was Buckminster Fuller, who already in the 1920s argued for an approach to design as world-encompassing system and continued to think design from the vantage point of systems developed in a number of ways after World War II (see Fuller, 1969 and Fuller, 1928).

7. Sanford Kwinter, "The hammer and the song." Diagrams, *OASE*, (48), 31–43 (1998), p. 36. Retrieved from https://www.oasejournal.nl/en/Issues/48/TheHammerAndTheSong.

8. "To take an example, therefore, from a very trifling manufacture; but one in which the division of labour has been very often taken notice of, the trade of the pin-maker. . . ." Book 1, Chapter 1 (Smith, 1776).

9. The famous example being Henri-Louis Duhamel du Monceau's treatment of a labor divided production of the 'pin' also discussed by Smith, as a first example of the origin of wealth in the industrial division of labor.

10. This term stems from Max Horkheimer and Theodor Adorno, who first introduced it in a radio discussion with Eugen Kogon in 1950 (Fischer, 2018). See also Horkheimer and Adorno (2002).

11. See also Dupuy (2000).

12. See Anders Michelsen, "The imaginary of the artificial: automata, models, machinics: Remarks on promiscuous modeling as precondition for poststructuralist ontology," in Wendy Hui Kyong Chun & Thomas Keenan (eds.), *New Media, Old Media: A History and Theory Reader*. New York: Routledge, 2006, pp. 233–247.

13. Often the English cybernetician W. Ross Ashby is seen as the first to define the notion of "self-organisation" (cf. Ross Ashby, 1947). See also von Bertalanffy (1969).

14. For an overview (Casti, 1994).

15. For instance, so-called second order cybernetics promoted by the secretary of the Macy Conferences, Heinz von Foerster, and the approaches to organic system developed by Humberto Maturana and Francisco Varela.

16. My translation. A.M.

17. In the following all translations mine. A.M.

18. All citations from Manzini (1991). In the following all translations mine. A.M.

19. See also Delanda (2016).

20. Ibid., p. 34.

21. The implications of the issue of the Anthropocene and human effected climate change is slowly getting a grip on the humanities and social science, for instance, by contributing to interest in materialism, from *self-organisations of the physical* and *assemblage theory* (Manuel Delanda), over John Protevi's proposition of *geophilosophy*, Timothy Morton's and others debate on *Object Oriented Ontology* and

hyperobjects, the *social life of things* (Arjun Appadurai) and *material culture* and *stuff* (Daniel Miller) as well as the strong feminist debate on the *force of things* (Jane Bennett), *materialism and potential* (Rosi Braidotti), *non-binary incorporeal* (Elizabeth Grosz), and *cyborgs* (Donna Haraway). Manuel Delanda, 'Nonorganic Life', Sanford Kwinter and Jonathan Crary (eds.) *Incorporations*. Zone Books, Zone 6 (Book 6), 1992, p. 129ff; John Protevi, 'The Geophilosophies of Deleuze And Guattari'. Delivered at the November 2001 meeting of SEDAAG. http://www.protevi.com/john/SEDAAG.pdf (accessed 04_08_19: 20:03); Timothy Morton, *Hyperobjects: Philosophy and Ecology After the End of the World*. Minneapolis: University of Minnesota Press, 2013; Graham Harman, *Object-Oriented Ontology. A New Theory of Everything*. Penguin Random House: Pelican Books 2018; Steven Shaviro. *The Universe of Things: On Speculative Realism*. Minneapolis: University of Minnesota Press, 2014; Arjun Appadurai, (ed.), *The Social Life of Things: Commodities in Cultural Perspective*. Cambridge University Press, 1988; Daniel Miller, *Material Culture and Mass Consumption*. Oxford: Basil Blackwell, 1987; Daniel Miller, *Stuff*. Cambridge: Polity Press, 2010; Jane Bennett, "The Force of Things: Steps toward an Ecology of Matter." *Political Theory*, Vol. 32, No. 3. June, 2004; Rosi Braidotti, *Metamorphoses: Towards a Materialist Theory of Becoming*. New York: Polity Press, 2002, 21; "A Theoretical Framework for the Critical Posthumanities." *Theory, Culture & Society* Vol. 0, No. 0 (2018), "Posthuman, All Too Human Towards a New Process Ontology." *Theory, Culture & Society*, 2006 (London, Thousand Oaks and New Delhi: SAGE), Vol. 23, No. 7–8; Elizabeth Grosz, "Merleau-Ponty an d Irigaray in the Flesh." Thesis Eleven Number 36, 2003; *Volatile Bodies. Toward a Corporeal Feminism*, Bloomington and Indianapolis: Indiana University Press, 1994.

22. Ibid., p. 347ff.

23. Zylinska further writes, a "feminist counter-apocalyptic framework creates a space for an ethical opening to the precarious lives and bodies of human and nonhuman others—including the male bodies and minds that have been discarded in the downsizing process of disruptive semiocapitalism" (Zylinska, without year and publisher, 44).

24. Ibid.

25. For instance of fungi (Robertson et al., 2012).

26. My italics. A.M. The quote is from a lecture from 10/9 1951, at *Rencontres Internationales* in Geneva.

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Chapter 9

Thinking Things and Thinging Thoughts

Architecture and Building in Postphenomenological Perspective

Lars Botin

INTRODUCTION

Building is, as Martin Heidegger put it, part of being human (1951), but not an exclusive human enterprise. Our companion species (Haraway 2003) build as well, and they do in a variety of ways that are surprisingly creative and novel. Our nonorganic companion, that is, technology, is capable of building as well, and in many ways, also capable of thinking the building on its own.

This chapter addresses in particular building as human praxis and process, hence 'building' on and referring to the early Martin Heidegger's elaborations on how we-are-in-the-world (Heidegger 1927). Heidegger wrote extensively on technology and things, and building, in his later postwar essays, but these are less interesting in this particular case, where I try to bridge Heidegger's phenomenology of things with postphenomenological multistability of things. In having less concern with the writings of the 1950s like "The Question Concerning Technology" (1951) and "Building Dwelling Thinking" (1951), I also try to escape the more gloomy and pessimistic judgments on technology and contemporary society, which overly characterizes Heidegger's later production. This said, it is inevitable to consider the later Heidegger for what concerns building and architecture, because the main part of phenomenological thinking within architecture refers to the two essays mentioned above.

BEING-IN-THE-WORLD

How we-are-in-the-world becomes the overall discussion, and the questions raised and possible/potential answers posed are fundamentally existentialist, but on the other hand in no way essentialist. It is the argumentation that we-are-in-the-world in myriads of modes and ways, which again is a reflection of practices, processes, procedures that are multiple and diverse on all possible levels: ontological, epistemological, methodological, and not least axiological.

Multiplicity, multistability, diversity, and differentiations are key elements in understanding how we as humans inhabit the world through and with technology, our nonorganic companion. Donna J. Haraway introduced the concept of our 'companion species' in a manifesto from 2003. In the manifesto she urges us to consider how our companion species ought to be considered as possessing an 'otherness,' which should be embraced in the way that is reflecting our being with human 'others.' Our nonorganic companion is also possessing an 'otherness,' which is not biological, and we are not tied to these companions through DNA or similar, but rather through bonds and strings of historical and cultural character. These bonds and strings are as strong as the biological and evolutionary ones that tie us to our companion species. In fact, the evolutionary aspect is as important in relation to our nonorganic companions.

This chapter will discuss the ties and bonds we as humans have with technology, where architecture and building is considered technology, and perhaps even technology par excellence.

Technology is always already there. Humans are intertwined with technology in a way that we cannot (and should not) separate ourselves from technology. Technology constitutes our being and has been decisive for the evolution of human species as such. In the following, I shall try to reinstall Martin Heidegger as key figure in this specific understanding of technology as coconstituent for human being, and as such for postphenomenology as philosophy of technology and architecture.

It is the overall assumption that in many of the early Heidegger's ideas are the seed for central concepts in postphenomenology as it was formulated by Don Ihde in the beginning of the 1990s (1990, 1993), because the foldedness of things and the multiplicity of practices and processes, that is, multistability is already present in Heidegger's formulations on what it means to *be*. Heidegger is of the opinion that the question concerning being is a fundamental ontological one, and that we cannot be sure of the answers that may arise from this questioning. When we ask about Being, we do not ask specific beings, that is, existing things, even though these are necessary for the original question on what it means to be. We will not find the answer(s)

by interrogating the existing beings/things, on the contrary we will be led astray and miss the meaning and importance of what it actually means to *be*. In our asking, answers and beings/things are always already there, they are part of our original question, but not as beings/things in themselves, but rather as common-sense and lifeworld appropriations and understandings of what a being/thing *is*. There is a directedness in our questioning, which is not determent for our answers, but delimit their range, content, and outline for what concerns the actual being. In this case, we are asking about architecture as technology, as the result of reflection and thinking on things, and vice versa. When we ask into the being of a thing, we are not interested in the thing in itself as a building, but rather of how it is a thing/building. We do not escape the thought of this being an actual building, and all of the tacit and explicit knowledge we have of buildings, this is accordingly part of our questioning, but rather ask how this building *is* in the world, as a building. That, which Heidegger also has coined as the toolness of the tool in the sample of the hammer—the buildingness of the building.

In postphenomenological perspective this is a problematic concept and term, because accordingly the toolness is not an absolute and definite character of the tool (technology/thing). What a thing is constitutes in the meeting in between humans–technology–world and refers to practices, processes, interpretations, and appropriations. Nevertheless, there is a directedness in the thing and how it *is*, which makes it so that we can delimit and exclude (im)possible coconstitutions. This is what Heidegger also addresses, when he states that the beingness of being is already part of its being. Beingness, toolness, buildingness is how Being concretizes as architecture in the world. These concretizations are not predetermined or stable, but imaginable and to some extent foreseeable, because being is already in Being.

Through Heidegger's ideas on *Dasein* we are very close and very distant from things as they *are*, but through our ontological questioning and further appropriations, practices, and interpretations we have the possibility of bridging the gap in between proximity and distance. Things are, in this process, unsure, uncertain, fallible, and so on, but nevertheless we have to take the chance and the stance in order to understanding how things *are*.

Heidegger also talks about the historicity of *Dasein* and how it connects to the discipline of history, and I find it illuminating to quote directly from the introduction to Being and Time (1927) "Only because it is 'historic' in the first place can an age lack the discipline of history" (Heidegger 1977: 64). In paraphrasing the abovementioned ontic and ontological connections in between history and historicity in relation to *Dasein*, the following statement evolves: Only because it is architecture in the first place, can it lack the qualities and discipline of architecture. The ontic condition of anything built is architecture, but if we are not able to think or reflect through what is present

then it lacks the ontological qualities of architecture, and these are in phenomenological perspectives: multiple, temporal, contextual, and intertwined.

How does the concept of phenomenology relate to building and architecture? Synthesizing on what is phenomenology Heidegger writes: ". . .to let what shows itself be seen from itself, just as it shows itself from itself" = "to the things themselves" (Heidegger 1927/1977: 72–73). The phenomenological method requires embeddedness and empathy: ". . .be seen from itself. . . ," which means that we have to be in it, in the actual being of the building, in order to get to the thing itself.

Earlier in the introduction to Being and Time (1927) he wrote that the disciplines of theology, sociology, and so on, are all determined by being the *science* of something (religion, society, etc.). Phenomenology is not the *science of phenomenons*, but a method of getting 'to the things themselves.' How do we get there? "the methodological meaning of phenomenological description is *interpretation*" (Heidegger 1927/1977: 85). On that note he explicates that phenomenology *is* a type of science: "phenomenology is the science of Being of beings—ontology" (Heidegger 1927/1977: 84). And the way to get there is to be aware of how things are constantly in different modes of showing themselves, appearing/disappearing, resembling, hence hiding themselves.

For Heidegger phenomenology, as coined by Edmund Husserl and himself, is philosophy: "Philosophy is universal, phenomenological ontology, taking its departure from the hermeneutic of Dasein, which as an analysis of *existence* has fastened the end of the guideline for all philosophical inquiry at the point from which it *arises* and to which it *returns*" (Heidegger 1927/1977: 85).

Phenomenology is not a philosophy of the actual, factual, and/or present, but rather a philosophy of the *possible* and *imaginable* (Heidegger 1927/1977: 85–86). The reason why phenomenology is not specifically concerned with the actual, factual, and present is that it has higher aims, and does not want to get stuck in trivialities and temporalities of facts. Facts and presentnesses are not ignored. They form the realm of beings, which are concretizations and materializations of Being, but Being, which is the focus of Heideggerian phenomenology, belongs to many spheres and manifest in many ways. Being might be invisible, tacit, hidden, forgotten, undiscovered, and so on, which means that it transcends the realm of physical existing entities. It is the quest of the phenomenological inquirer to chase and hunt the possible and the imaginable in order to uncover and discover Being—or *Dasein*—which in this case are synonymous. Phenomenological inquiry is impossible without 'beings,' that is, facts, actuality, present, and so on, but from the outset the inquiry should be suspicious (critical) in relation to how things are constructed as facts and actualities. They might be resemblances and disguises, or based on false and fragile assumptions, which have reached the status of

undisputed truth. This is why phenomenology, as critical inquiry of Being and beings, has high relevance in contemporary debate on incumbent problems concerning analyses of big data, fake news, and climate change, just to mention the most pressing of the problems we face today.

When returning to building and architecture, there is something ontological going on when it comes to the concept of architecture and the only way we can get there is through phenomenology, which again requires a hermeneutic stance when it comes to descriptions. As I was saying, there is some sort of default in the concept of architecture. Every built environment made by humans or nonhumans is from the outset architecture, but then again it is not, if we are not capable of doing ontological inquiry in the thing itself. The thing itself is both showing itself, but at the same time concealing itself through disguise, disappearance, resemblance—or what Baudrillard in postmodern times called *simulacra* (Baudrillard 1994). This means that it is hard work to analyze things in themselves, also because the tool in itself—phenomenological inquiry—is under the same siege. The tool itself is also vanishing, disappearing, dissolving, while we use it in our investigations. This is why one of the ways of doing phenomenological inquiry (fieldwork) is to retrace your movements, actions, and reflections in order to recognize when, where, how, and why things vanished, disappeared, and/or dissolved. Heidegger's forewords to his first postwar publication *Holzwege* (1950) is a short description of what it means to be on a 'woodpath.' We walk on paths in the forest and we are unable to predict where our walking will lead us. Many times, we will find ourselves in dead ends, the meaning of *Holzwege*, but sometimes we will also reach a lightening in the forest. Independently, we learn to know the forest by walking and retracing our paths, and through experience we appropriate the forest and gain expertise.

Postphenomenology is concerned with our relations with technology, and questions the various ways we engage with technology in our everyday life practices. On a general level postphenomenology dismisses Heidegger when it comes to a useful and meaningful understanding of technology. Don Ihde has on several occasions claimed that Heidegger most certainly has a thorough understanding of time, but did not understand anything about technology (Ihde 2010, 2012). Accordingly, Heidegger is caught in dystopian, irrational, and Luddite mode when it comes to modern technology. I have tried to give a different picture and a different interpretation of Heidegger (Botin 2013a,b, 2015, 2017, 2019) where I, in various fora, argue that Heidegger was not a dystopian or a Luddite machine-stormer, but rather poses relevant critical questions to the ontology of technology in relation to humans and the world. This means that technology is not an inanimate object or a mere tool. It is coconstitutional on all levels, and codeterment for our being, and for Being as such. A similar attempt was made by Zwier, Blok, and

Lemmens in "Phenomenology and the Empirical Turn: A Phenomenological Analysis of Postphenomenology" (2016), where they claim that the postphenomenological dismissal of the phenomenology of Heidegger as erroneous, insufficient, and useless is wrong, because exactly capable of showing how human–technology relations are ontological, which means more than ontic and empirical. The authors further claim that postphenomenology is ignorant of how mediation, which is the central concept in Peter-Paul Verbeek's take on postphenomenology (Verbeek 2005, 2011), is technical in its theoretical stance, meaning that *enframing* (Gestell) is already always happening in human–technology mediations. I shall return to how *enframing* can be conceived in a different manner than usually, when it comes to *how* we are together with technology in common enterprise.

POSTPHENOMENOLOGY AND ARCHITECTURE

Hitherto I have only briefly touched upon the meaning of postphenomenology, which according to Don Ihde is *more phenomenology*, a sort of phenomenology 2.0. Ihde writes that it is the addition of American pragmatism to phenomenology that gives birth to postphenomenology, meaning that the pragmatist focus on utility and efficiency adds to phenomenology's focus on perception and practice. Ihde grants that his perspective on reality remains phenomenological, hence postphenomenology. Other authors in this anthology, as well as in the introductory chapter, have explained the core traits of postphenomenology, which means that I will not dig further into the various human–technology–world relations developed by Don Ihde and later Peter-Paul Verbeek. I shall focus on the alleged antiessentialism of postphenomenology in relation to a linguistic chiasm that I have developed on this occasion. I claim that thinking is intertwined with things in a most essential way that makes it so that the intertwinement cannot be dissolved. *Thinking Things* is interdependent with *Thinging Thoughts*. As we think things, they on their behalf arrange and mold our thoughts. Thoughts are not independent of what they think upon, that is, things, and things have always been thought. Thinking is impossible without things, and both Heideggerian phenomenology and postphenomenology have similar and overlapping ideas on this relationship. The 'I-Technology-World' relations by Ihde, and his use of brackets, hyphens, and arrows are clear manifestations of this, and Heidegger's ontological inquiry of how technology as *Gestell* is coconstitutional and codeterment show how things and thinking cannot be separated, and delegated to, respectively, a subject and/or object.

Architecture is seldom reduced to a thing in conceptualizations on human enterprise in construction and building, neither is architecture considered a

technology. The reason for this should probably be seen as a result of how architecture historically has been considered an artistic enterprise, performed by the gifted and privileged genius, that raised blunt building and construction to the spheres of art and creativity. This chapter treats architecture as a *thing* and as a technology, which means that conceptualizations on genius, creativity, and art, at least in a classical sense, are absent from the analysis. In the former paragraph, I claimed that architecture is already always a thing—a being—a concretization of a thought; and that it reaches toward Being by its ontological force, which makes us recognize it as architecture. This outreach toward Being is in postphenomenological terms mediation, and, according to Zwier et al., it is technical (Zwier et al. 2016). This process is what I have coined *thinging*. The technical mediation which brings us closer to Being and Dasein, that is, unraveling, disclosure, and uncovering, is a process of *thinging*.

The neologism *thinging* is derived from the original Nordic 'thinge,' which means to trade/negotiate (Chantrell 2004). Trading and negotiation is always performed by somebody in relation to something, and involves a plurality of things, bodies, and techniques for trading and negotiating. As Bruno Latour has pointed out *thing* (Ding) is also present in the Nordic parliaments (Altinget (Iceland), Stortinget (Norway), and Folketinget (Denmark)), meaning that *things* have politics as well (Latour 2005). So, trading and negotiation is not just about goods and stock, but also about decisions and power. *Thinging* is in this perspective both tied to ontic beings—things in their whatness—but also directed toward unraveling and disclosure of 'truth.'

This reading of *thinging* is clearly Heideggerian and could be read in opposition to postphenomenological antiessentialism, but I think that exactly the plurality and diversity of the possible mediations points in a direction that comply with postphenomenological multistability. Tradings and negotiations on and in between things and bodies are multistable on an ontological level.

Returning to architecture as a *thing* and technology then the multistability of our being with and through it shows itself through our being *in* it. This being is material and concrete, and we create meaning and understanding through hermeneutic descriptions. The latter is multistable per se, because interpretations, as well as practices, are various and different interdependent with contexts.

Architecture surrounds and contains our bodies in a variety of ways, and has different functions in relation to containment. Houses and apartments frame our daily life bodies, while it eats, sleeps, make love, relax—quarrel, argue, fight, and kill. Hospitals frame our fragile and sick bodies with the aim of procuring, care, relief, cure, but also contains despair, destruction, and death. Hospitals are also a workplace for health professionals, and as such hospitals are also considered from a work environment perspective. Libraries,

museums, concert halls, and so on, contain things for learning, leisure, experience, and delight. Possibilities for classifications of architecture and buildings are numerous and the different qualities a certain architecture should possess in order to remain architecture are as multiple.

The German/English historian of architecture Nikolaus Pevsner claimed that not all building could be architecture, like for instance a bicycle shed or similar 'humble' and functional structures (Pevsner 1960). The conviction is still reigning within the analytical and theoretical framework of architecture, where architecture is considered the result of *spiritual* work and reflection and not a product of material possibilities, functions, requirements, or even social conditions (Pevsner 1960).

On this note it is worthwhile dwelling at how architecture has been conceptualized through history. Treatises on architecture have been written ever since Vitruvius published his famous books on architecture in the first century AD. From the fifteenth century until today treatises have been thought and published incessantly. So, there are many thoughts on architecture and how it should be built. Treatises have mirrored contemporary focuses on nature and the role of nature, human proportions in relation to building, new materials being discovered and implemented like concrete, glass, steel, and so on, religious and social life—just to mention a few of the contextual factors that influenced authors of treatises. Many of the authors were trained architects as well, like L. B. Alberti, A. Palladio, the Bibiena family, Viollet-le-Duc, and Le Corbusier, whereas others had very little familiarity with the practice of designing and building, like Carlo Lodoli, J. L. Laugier, and Sigfried Giedion.

Authors with little practice in building can generally be classified as purists, minimalists, and conveying to functionality and rationality, whereas authors with some training within architectural practice have their attention addressed toward classical architectural virtues like proportions, scale, and style, but also toward the fluffier qualities like the sense of materials, and the lifeworld of inhabitants and users. Alberti's early description from the 1450s of how a hospice/hospital should be built in order to convey to the needs and requirements of patients is exemplary in this context (Alberti 1755/1986). Independently of whether practitioners or theoreticians *style* remains a common denominator, that phenomenological and postphenomenological approaches would escape.

Don Ihde claimed utility and efficiency as qualities that postphenomenology through its inspiration from pragmatism would focus upon in inquiring. It is obvious that any architecture should have these virtues, which Vitruvius also pointed at in his antique treatise on architecture (see introduction to this anthology). But there is more to it than that. Utility and efficiency is in this case a reduction that misses the experiential and sensuous qualities that architecture should possess as well. How to account for these more transcendental qualities, which we cannot describe through calculation and classification?

Postphenomenology, as main part of other STS approaches from the past forty years, that is, the *empirical turn*, has not been able to deal with these types of qualities. Let alone set up criterions for inquiry on these matters.

Here again I have to address attention toward the work of Martin Heidegger, whom in focusing on art and poetry as 'work,' or something that is 'at work,' shows us how these experiential and sensuous qualities can be embodied and become alive in our lifeworld. On this note it is important to make the distinction in between two worlds that our bodies inhabit. Our bodies as organs, flesh, bones, and skin is calculable and can be optimized in relation to efficiency and utility (Körper). Our bodies as interconnected to other bodies and to things is a much more complex entity, where calculation is possible, but would be insufficient and sometimes even harm this body of ours. This is the lifeworld of the body (Leib), and meaningful architecture, which means architecture we can think through, preserves, conserves, and nurtures the qualities that lifeworld is constantly aiming at, that is, getting close to Being.

Postphenomenology has been very critical toward Heidegger's philosophy of possibility. The concept of possibility is according to both Ihde and Verbeek restraining our understanding of technology in a negative way (Ihde 2010; Verbeek 2005). The possibility of technology is *enframing*, and furthermore the conditions for possibility are transcendental and pointing at an essential state of technology, which is exactly restraining and constraining. I think that Heidegger himself is aware of this danger, and in pointing at *how* things could be otherwise in their journey toward Being then also different possibilities arise. I do not see antinomy in between possibility and 'looking forwards' as do Verbeek in *What Things Do* (Verbeek 2005: 144–45). Possibility and what is possible is, as I see it, a way of framing multistability, because somethings are possible and meaningful, whereas others are impossible and insane. I do agree with Ihde and Verbeek on the fact that postphenomenology "goes much further than Heidegger did in pointing out that science must be seen as applied technology rather than the other way around" (Verbeek 2005: 144), which means that technology as the result of calculative thinking is 'false' picture of technology, and that technology is much more than calculation, efficiency, precision, and function. On the same note, I agree upon the statement that postphenomenology is 'more phenomenology' (Ihde 1993), that is, phenomenology 2.0.

As I see it postphenomenology could achieve considerably if the criticism of Heidegger was reconsidered, specifically for what concerns Heidegger's conceptualizations on how *things* paradoxically both obstruct, obscure, facilitate, and pave the way toward Being. This is a different type of *enframing* than mere technical instrumentalization of Being, where humans and world are set as standing reserve for use and exploitation.

Phenomenology and postphenomenology is being with things, and if postphenomenology is 'more phenomenology' then we are even closer and more proximate to things than original phenomenology tells/allows us. In being close to things originates an intimacy and an understanding that touches our bodies both as *Körper* and *Leib*. We are moved both physically and mentally, even though this distinction is really false, as is the distinction between *Körper* and *Leib*. Things affect our movements, behaviors, and thoughts in a variety of ways and in different directions. We can think architecture with clear intentionality of controlling and steering our movements, behaviors, and thoughts as did the Bauhaus movement (1919–1933), as well as totalitarian fascist, nazist, and communist intentions of the same. We can think of architecture meant for nudging and sharpening our experiential embodiment of place and space, like for instance Rudolph Steiner's experimental architecture and to some degree Scandinavian architecture of the 1950s and 1960s. These two opposite approaches to address movement, behavior, and thought in relation to architecture constitute two strands in modernity, which postphenomenology can critically address. First of all, the minimalist, functionalist, rational, and analytical approach of the Bauhaus school, and similar American and European approaches from 1918 to 1945, where humans were considered as part of a machinery meant for optimization and efficiency on all levels. Secondly, the emotive, sensuous, corporeal, phenomenological understanding of how architecture should enhance and facilitate our intimacy with the phenomenons of the world: light, water, earth, and so on. Thirdly, a more hybrid approach to building and architecture which is constituted by the Swiss architect Le Corbusier, who seems to try to bridge the gap in between rational decontextualized thinking and construction, and the embodied contextualized construction and feeling (Pallasmaa 2005).

Postphenomenology would say that there are different qualities in these three modernist approaches to architecture and would be able to reconfigure new practices and interpretations of construction, that is, architecture. The antiessentialism of postphenomenology points in a direction where architecture is more than one thing, and may be architecture for some and mere construction/building for others. Some may find architectural qualities in the simple hut or even in the bicycle shed, whereas others will refuse these qualities and classify them differently. The vernacular farmer's house built by clay and mud in the Atlas Mountains, which is in a constant building process, depending on weather and social factors, has in a postphenomenological reading extremely high qualities, because the exemplary sample of multistability in time and space, as well as bearer of classical phenomenological virtues as organic representations of lifeworld,

and made out of the materials that can be found in the immediate context. In Nikolaus Pevsner's perspective, vernacular constructions and structures are not worthy of mentioning, because escaping the paradigm of *style*, which according to Pevsner is what characterizes all architecture (Pevsner 1960).

THINGING ARCHITECTURE: AN EXPERIMENT OF THOUGHT

Postphenomenology is, among other philosophical positions and perspectives on technology, against the distinction in between subjects and objects, and accordingly there is no such thing as exclusive and sovereign thinking. Things affect our thinking; things are in our thinking. They are always already part of our thinking. We do not think about things. We think with and through things. It goes the same the other way around. Thinking is always already in things. Things are only thinkable, meaning that they would not exist without thinking. Thinking and thinging are intertwined as we-are-in-the-world. We *thing* (the verb) as we *think*. What does this mean in relation to how we as humans are-in-the-world through and with technology. First of all, it emphasizes what goes on in between humans–technology–world, that is, focuses on the hyphens and the connections/directions in the relationships. *Thinging* focuses on the practices and experiences we make while being with technology in the world. *Thinking* is concerned with the interpretations and (metaphysical) understandings that we create while being with technology in the world. As I was saying they are intertwined and inseparable, and processes happen simultaneously, meaning that one does not follow the other.

Being proximate and intimate with technology as *other*, which postphenomenology accordingly is, means that *thinging* and *thinking* is enhanced, enforced, invigorated, and our feeling and sense of the *other*, our nonorganic companion, is embodied on all possible levels. Architecture is *thinging* our being-in-the-world. It sets the multiple conditions for living (and dying) and it constantly constitutes our being. The French phenomenologist Gaston Bachelard was aware of that, as he wrote *Poetics of Space* (1958), because pointing at how space and place shapes our embodied memory. Martin Heidegger's essay on "Building Dwelling Thinking" points at how things are intertwined, and even at the fact that we cannot think unless we have built and dwelt. In this particular perspective, I, as do postphenomenology, do not follow Heidegger's dismissal of thinking on behalf of practice, but see them as interlinked, and on an even level.

GETTING CLOSER

Postphenomenology is getting closer to the things themselves, if we are to believe that it is 'more phenomenology.' In getting closer we lose oversight and orientation, but this is an ontological condition of all phenomenology. Being proximate in architecture grants us the possibility of embodied meaning construction, which actually eliminates, at least for a while, architecture as blunt background relation in a postphenomenological sense (Ihde 1990). On this level and in this relation, architecture becomes mediation in a variety of ways. It shows us an image/representation of the surrounding world and we interpret the representation in order to gain knowledge of the world. We act according to the rules and regulations that the architecture imposes on us in relation to behavior, actions, and movements, and the *otherness* of both ourselves and the building in itself becomes apparent. Bachelard showed us that architecture can also become totally embodied, which means that it fuses with us, and we live, experience, and sense the world through architecture. By this I mean that architecture can be designed intentionally for certain purposes and experiences, but getting close to the actual building means an opening toward other possible appropriations and interpretations. The decontextualized modernist open office landscape will always affect who is in it, but it will not necessarily facilitate efficiency and socialization as it was meant for, for some it will be an alienating and harmful construction, and for others a way of hiding in the crowd.

Being close physically and emotionally to the built environment that we are part of means that we reflect on the nature of this closeness. We think of the intimacy of floors, ceilings, walls, doors, windows, and we sense the presence/absence of size, scale, proportion, materials, as we move around in the building and in between buildings. We feel how the structures of the building affect our moods and modes, and we react in a variety of ways.

The Norwegian architect and philosopher of architecture Christian Norberg-Schulz wrote his doctoral thesis at Oxford University back in the middle of the 1960s, and in it is present a strong Anglo-saxon analytical philosophy of objectivity. It is typical modernist in its belief in rationality, calculation, and causality. Norberg-Schulz traveled subsequently to Italy to study the Italian baroque and was overwhelmed and converted to total opposite vision upon architecture. One of Norberg-Schulz central concepts from this period is genius loci, meaning that a place has spiritual qualities that transcend physicality and extension. In order to get close to these spiritual qualities of the place, you have to be in place and relate to the elements that are present. These will not tell you in specificity anything of these immaterial qualities, but they will reveal in how they relate to other elements/things in that place the genius loci of the place (Norberg-Schulz 1974).

All of this means that it is almost impossible for the architect to design for a specific purpose and use. So, where does this put the architect in relation to designing? How should she/he *think* or/and *thing* when designing? Peter-Paul Verbeek has pointed in specific directions that could inform this process, and in the following I shall discuss Verbeek's instrumentalization of intentionalities.

DESIGNING *THINGING* AND *THINKING*

Is it possible or even admissible to design for *thinking* and *thinging*? Is it not a sort of *hubris* to set the framework for human endeavor and behavior? We could answer the first question by a firm no, and the second with a similar firm yes, but where would that leave us? Designers and architects have always conceptualized and designed with an outset in setting the framework for possible actions and behaviors, and often with an ethical and/or political agenda. So, there is nothing new in 'moralizing technology' (Verbeek 2011), or designing from a political and ideological outset (Winner 1980).

Verbeek suggests that when it comes to the mediating force of technology then it has to be seen as intertwined with designers and users. They perform on an equal level in relation to mediation, and we have practices and interpretations of these mediations. Architects, users, and architecture perform together in a sort of dance, where intentionalities are distributed in between them, as the 'music goes on.' Verbeek writes: "Designers need to anticipate the mediation effects of their designs as much as they can, by performing mediation analyses with the help of their moral imagination and using such analyses in moral decision-making processes. Users, in turn, need to anticipate technological mediations as well, to the extent to which such mediations result from their appropriations and interpretations of the technology" (Verbeek 2011: 132).

Architecture is not harmless framing of human existence, it engages, involves, and effects on all possible levels, it is a being that constantly strives toward Being, that is, toward a fulfillment of itself. This is why humans, architects and users, need to imagine, anticipate, and act as they design, develop, and appropriate architecture. According to Verbeek this will make it so that, with few exemptions, architecture will perform adequately in relation to use and appropriation. The multistability of architecture is in this view controllable and predictable (to a certain degree), if we use our imagination and try to forecast and act responsible in our appropriations and interpretations. This is where the concept of *thinging* begins to make sense, because it is the 'dance of agency' (Pickering 1995) in the twirl of interdependency and interaction. *Thinging* is imagining, anticipating, and acting in the agora of

appropriation and interpretation. *Thinging* happens somewhere in relation to something. *Thinging* is concrete, which means that we imagine and anticipate in relations to the actual time and place that we are part of. *Thinking* might be abstract and metaphysical, and hence escape the agora, but in this perspective *thinking* will always be *enframed* by *thinging*. This is a different type of *enframing* that is normally attributed to the Heideggerian *Gestell* and the concreteness of *things* and how we deal with these is pierced, combined, and enframed by imaginary force and anticipatory intentions.

Verbeek pointed at the fact that in the 'dance of agency' it is both the architect and the user that are performing the mediation of *things*, which could point in a direction where some sort of participatory design process could be the agora for interaction. This is not the case, because the purpose and aim of 'moralizing' things is not to create yet another participatory design process, but rather to make architects and designers imagine, anticipate, and act on parallel and simultaneous paths with similar technological processes, which also are imaginative, anticipatory, and performative. Andrew Pickering, who originally coined the concept of 'dance of agency,' puts it this way: "the open-ended dance of agency that is scientific practice becomes effectively frozen at the moments of interactive stabilization into a relatively fixed cultural *choreography,* encompassing, on the one side, captures and framings of material agency, and, on the other, regularized, routinized, standardized, disciplined human practices. I think such choreographies are omnipresent in all our dealings with machines" (Pickering 1995: 102). The dancers in the choreography are architects, users, and buildings and they perform together in a variety of ways that stabilize/freeze in similar multiple ways, that is, multistability. The notion of *choreography* is striking in relation to the intertwinement in between humans and buildings, because this is what exactly is happening. The architect has a plan for how 'dancers'—users and buildings—should move, act, and behave. These plans are modified and changed as users and buildings begin to 'dance,' and it is the role of the architect, according to Verbeek, to forecast and imagine the 'dance of agency' to the extent that this is possible. Verbeek stresses that these imaginaries and forecasts should be framed ethically and morally: "The mediation approach starts from the idea that human actions and decisions are always mediated, and from this perspective ethics consists in carefully assessing and experimenting with technological mediations in order to coshape the technological mediation of people's existence in a technological culture" (Verbeek 2011: 134–35). Pickering points at the fact that the choreography will lead to stabilizations, which again means that the framework is decisive for the possibilities for stabilizations.

Heidegger also uses the metaphor of the dance, when it comes to how *thinging* can be framed. In the essay "The Thing" (1971), he writes that it is the 'round dance' of the fourfold that worlds the world, that is, makes the

world become world. The interaction in between the fourfold elements—the mortals, earth, sky, and divinities—constitutes *thinging*, which is a framing: "Thinking in this way, we are called by the thing as the thing. In the strict sense of the German word *bedingt*, we are the be-thinged, the conditioned ones. We have left behind us the presumption of all unconditionedness" (Heidegger 1971: 178–79). The twirl of the 'round dance' or the 'dance of agency' is conditioned and enframed by the thing as the thing. Not everything is, or should be, possible and/or doable as we get closer to the world through the thing. The thing mediates, in Verbeek's terminology, our nearness and proximity to the world. This is what the thing does, when *thinging* goes on. It brings us closer to the world in intimate and caring way: "Thinging is the nearing of world. Nearing is the nature of nearness. As we preserve the thing *qua* thing we inhabit nearness" (Heidegger 1971: 179). Here it remains to understand which are the qualities and criterions that mediate this nearness, and according to the verbs that Heidegger affiliated to the fourfold, then it is 'saving,' 'receiving,' 'awaiting,' and 'initiating' (Heidegger 1971: 148). We should save and preserve the earth, receive the gifts of the sky without altering the order of the universe, await the coming of divinities without fatalism or similar, and initiate our journey toward death in order to die a good death. This is what brings us close to the world as world, and the thing is the mediator of this process. Now is the thing synonymous to technology/architecture? When reading the core texts by Heidegger it becomes readily apparent that technology is part of *thinging*, without being the thing in itself. Technology sets the framework for *thinging*, as *thinging* sets the framework for thinking, and is as such the prerogative for beings on their journey toward Being.

If we stick to Ihde's statement that postphenomenology is 'more phenomenology,' then we should be able to get even closer and more intimate with the world through and with technology as a *thinging*. According to Heidegger we measure space through our bodies, and we do that through our being with things in space, like for instance the chair, the bed, the table, and so on. Through everyday use we embody these elementary things that gradually makes us 'understand' the space in which these are placed. In Heidegger's case, he 'measured' the hut in the forest through its inventory, and the hut 'measured' the surrounding forest, which means that as he wandered the paths of the forest he already and always had it embodied through the hut. We move from a micro-level to a macro-level embodiment and understanding, which is exactly the take on postphenomenology in this anthology on architecture. Postphenomenology had in its origins a focus on how we embody technologies on a microscale, and has been less concerned with bigger structures like buildings and cities. Heidegger shows us the path of transition from micro to macro, being how we 'measure' space through our everyday use of things like, for instance, 'mobiles' e.g. chairs, tables, beds, bicycles, cars,

and so on. The postphenomenological appropriation of space is mediated by 'mobile' technologies that bring us closer to possible ways of coconstitutions with architecture.

CONCLUSIONS

In this chapter on Thinking Things and Thinging Thoughts in postphenomenological perspective, I have tried to show how the ideas of Martin Heidegger on being and Being, and on *things*, constantly focus on transition, frameworks, and embodiment. Postphenomenology being 'more phenomenology' takes up these foci and shows us how world(s) is mediated through and with technology. Architecture is in this perspective technology, and furthermore it is also a container of technology, where the different types of technology constantly 'measure' the architecture, as the architecture 'measures' the surroundings. It is obvious that the influence and impact are equal the other way around, meaning that the infrastructure of the city effects buildings, as buildings effects inventory, and in the end humans. This seemingly production of humans as cogs in a machinery has not been the focus of this chapter and would necessitate a different theoretical and ontological take on 'the dance of agency' than phenomenology and postphenomenology. Postphenomenology gives the possibility of getting close and intimate to technologies, where direct corporeal and physical proximity gives the opportunity of understanding how this togetherness can tell us something structural and systemic. This closeness and proximity has been described by both Ihde and Verbeek through various human–technology–world relations of embodied character, and in this chapter I have not tried to classify architecture in specific way, that is, embodied, hermeneutic, alterity, background, dialectic, hybrid, composite, and so on, but rather tried to show that architecture is something more and else than the expected background relation that only calls upon our attention when it is 'broken.' Architecture is embodied, interpreted, practiced in a variety of relational ways that are multistable, interdependent with use and appropriation. Architects, designers, and urban designers partake in the construction of meaning and appropriation, and they should consider how various embodiments can take place in the 'round dance' and/or 'dance of agency' in between technology (design, architecture, city) and users/people/citizens, because they mutually shape each other. Postphenomenology, as Heideggerian phenomenology, emphasizes the notion of nearness and proximity and through this nearness we gain understanding of how this relationship is mirroring/reflecting something on a larger structural and systemic level. We get an embodied experience of the city through the technologies of the city, that is, houses, buildings, roads and cars, bicycles and lanes, benches

and sheds, and so on. This is what postphenomenology is capable of as an ontological approach to how we can grasp in a meaningful way, how we are spatially embodying reality, and how we are inevitably tied to our nonorganic companions.

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Part V

BUILDING

Chapter 10

Building Dwelling and the End of Thinking

Søren Riis

In a double sense, Martin Heidegger succeeded in making the human dwelling on earth questionable. In his lecture *Building Dwelling Thinking*, held in Darmstadt in 1951, he took the field of architecture from a matter of little philosophical notice to a matter of crucial philosophical importance. By connecting reflections on architecture and the built environment with some of his early insights from *Being and Time*, Heidegger developed a concept of dwelling able to reveal fundamental characteristics of being human, and by the same token, to give our human existence a unique positive significance.

In the research literature, the fundamental ambivalence of Heidegger's notion of dwelling has so far mostly been overseen. In the present text, however, I will develop this ambivalence and use it to unfold a notion of dwelling, which shows more clearly the inherent dangers of dwelling. Initially, I argue along the lines of Heidegger and emphasize that the concept of dwelling should indeed remain questionable. In a second step, I'll show that this is not due to Heidegger's concerns about our inability to dwell, on the contrary, dwelling needs to stay questionable as it manifests a human activity to control and condition human beings to recede into an almost sedated existence that may ultimately lead to the *end of thinking*. What Heidegger associates with the concept of dwelling turns against himself in its extrapolation and manifest itself as a clear and present danger. In this way, Heidegger's concept of dwelling also connects with his own early insights into inauthentic existence and with what he later portrays as the danger of modern technology.

With reference to the title of this chapter, Heidegger sees an intimate connection between building and dwelling on the one side, and the exclusive concept of thinking on the other, whereas I will aim to show the previously

hidden connection between building and dwelling on the one side and the end of thinking on the other. By extension, this danger is not least manifest in what today has come to be known as *smart homes* that promote "easy living," but ultimately regulates and automates human existence. *Smart homes*, so the claim here, are the physical convergence of human dwelling and Heidegger's concept of the *enframing*.

In order to clarify what is at stake and at the same time outline the scope of this chapter, I will reposition Heidegger's etymological discussions in the context of thinking motifs from *Being and Time*. In doing so, it is important to draw attention to the overcoming of dwelling in favor of a more authentic and receptive form of existence. On the basis of this critique, it becomes gradually clear that the present interpretation of dwelling opens up for new ways to view and engage with Heidegger's basic concepts.

The present critique of Heidegger has been made possible through post-phenomenological considerations that emphasize the analysis of the material and technological embeddedness of particular lifeforms and practices (see also Riis, 2011a, 2013).

We shall now turn to Heidegger's own interpretation of dwelling in order to clear the ground for the new interpretation—an interpretation that owes a great deal to Heidegger and the tension within his own text. Precisely because this understanding of architecture is developed as a response to Heidegger's ambivalent notion of dwelling, it is also in debt to his thinking.

DWELLING AS LIVING WITHOUT DANGER

In the two-part lecture *Building Dwelling Thinking (BDT)*, Heidegger first of all explains the concept of dwelling against the background of the building. In a second step, he turns the perspective around and shows "what building, understood by way of the essence of dwelling, really is" (Heidegger, 1993a, 353).

Heidegger points to three different origins of dwelling in order to better explain how dwelling descends from building. First, in the sense of the Old High German word for building "buan," building means to remain and to stay in a place (Heidegger, 1993a, 348). The semantic similarity of the two terms, dwelling and building, is thus initially clear, but as Heidegger later shows, the two terms are not merely related, they originally have the same meaning, which has been lost, "but a covert tace of it [the meaning of bauen] has been preserved in the German *Nachbar*, neighbor. The *Nachbar* is the *Nachgebur*, the *Nachgebauer*, the near-dweller, he who dwells nearby" (Heidegger, 1993a, 348f). Second, before Heidegger goes on to clarify further

how dwelling is understood (as building), he draws attention to the fact that building is not a human activity like any other. Dwelling, thought of as building, is fundamentally connected to being human: "Where the word *bauen* still speaks in its original sense it also says *how far* the essence of dwelling reaches. That is, *bauen*, *buan*, *bhu*, *beo* are our word *bin*. . . . The way in which you are and I am, the manner in which we humans are on the earth, is *buan*, dwelling" (Heidegger, 1993a, 349). This close relation between being and dwelling stands out even more clearly in English than in Heidegger's mother tongue, German. In English, the concept of living exactly has the double meaning of dwelling and being. Third, Heidegger makes it increasingly clear how we are supposed to think of dwelling. Originally it means "to cherish and protect, to preserve and care for, specifically to till the soil, to cultivate the vine" (Heidegger, 1993a, 349). As Heidegger draws on the phrases "till the soil," "cultivating vines," but also "temple-building," he reaffirms the Latin heritage at the base of dwelling: *colere*, *cultura*, *aedificare* (Heidegger, 1993a, 349). Through these etymological reflections Heidegger succeeds in raising the significance of the concept of building and pointing in the direction, which shall later become more important for the thesis advanced in this text.

> Building as dwelling, that is, as being on the earth, however, remains for man's everyday experience that which is from the outset 'habitual'—we inhabit it, as our language says so beautifully: it is the *Gewohnte*. For this reason it recedes behind the manifold ways in which dwelling is accomplished . . . The proper sense of *bauen*, namely dwelling, falls into oblivion. (Heidegger, 1993a, 349f)

In a further step, Heidegger differentiates between two modes of building, namely, as a cultivating, preserving, and nurturing activity on the one side, from building as a pursuit of constructing and raising up on the other. Building as preserving and nurturing takes care—"it tends the growth that ripens into fruit of its own accord" (Heidegger, 1993a, 349), while building as constructing in the sense of temple-building and ship-building "do in a certain way make their own work" (Heidegger, 1993a, 349). Building as preserving and nurturing gives rise to an understanding of building as a continuous engagement, whereas building as construction may give rise to the misunderstanding of regarding the activity of building as a means toward an end that separates building from dwelling. To understand Heidegger's interpretation it is of crucial importance not to separate building from dwelling: "We do not dwell because we have built, but we build and have built because we dwell, that is, because we are *dwellers*" (Heidegger, 1993a, 350).

Heidegger reverses one more time the perspective after these fundamental but preliminary remarks, and gathers the more specific meaning of dwelling

as preserving and nurturing from the Old Saxon "wuon" and the Gothic "wunian," which mean to remain and to stay in a place—verbs which do not involve any pronounced activity (see Heidegger, 1993a, 350 f). Heidegger explains further:

> The word for peace, *Friede*, means the free, *das Frye*, and *fry* means preserved from harm and danger, preserved *from* something, safeguarded protected. (Heidegger, 1993a, 351)

Dwelling as "to remain in peace" is however something positive in Heidegger's interpretation in the sense that it means that we return the notion to its essential being and free it to mean preservation of peace (Heidegger, 1993a, 351).

The nurturing and preserving of building something—conceived against the background of dwelling—is an activity that is aimed at safeguarding the essence of things; in other words, we spare for the sake of the essence: "*The fundamental character of dwelling is this sparing [schonen]*. It pervades dwelling in its whole range. That range reveals itself to us as soon as we recall that human being consists in dwelling and, indeed, dwelling in the sense of the stay of mortals on the earth" (Heidegger, 1993a, 351).

Based on these systematic etymological explanations of dwelling, Heidegger also wants to draw attention to *where* dwelling takes place. The activity of dwelling takes place on earth, Heidegger adds. From this geographical location Heidegger opens up a social and religious dimension of dwelling: "But 'on the earth' already means 'under the sky'. Both of these *also* mean 'remaining before the divinities' and include a 'belonging to men's being with one another'. By a primal oneness the four—earth and sky, the divinities and mortals—belong together in one" (Heidegger, 1993a, 351).

This line of thinking, where Heidegger unfolds dwelling by elaborating what it means that dwelling takes place "on earth," presents a turning point for the interpretation at hand. At this crucial point, Heidegger continues his thinking concerning dwelling into an elaboration of the *fourfold*, but because there is a leap in his thinking in this transition, which opens it up to criticism, we do not have to follow this trace in order to appreciate Heidegger's previous reflections. Most human activities take place "on earth," and any of these activities thus stand in the same relation to the *fourfold*, that is, the connection between dwelling and the *fourfold* is underdetermined in Heidegger's interpretation. As Heidegger goes on to describe the constituting unity of the four concepts—earth and sky, the divinities and mortals pertaining to the *fourfold*, he concludes: "Mortals dwell in the way they safeguard the fourfold in its essential unfolding. Accordingly, the safeguarding that dwells is fourfold" (Heidegger, 1993a, 352). What Heidegger points out in connection to this general claim we will

only briefly discuss, and instead hold on to his initial assessment of dwelling as *preserving from harm and danger*, and as the very purpose of being human.

In what may be seen as the second part of Heidegger's lecture, he turns his attention to the concept of things. According to Heidegger, humans can only safeguard, "by bringing the essence of the fourfold into things" (Heidegger, 1993a, 353). With this claim, Heidegger addresses the question of "what is a built thing?" and thus connects the two different ways of dwelling, namely, dwelling as safeguarding with and dwelling as building.

Heidegger clarifies that the word *thing* comes from the concept of gathering (see Heidegger, 1993a, 355). A built thing thus gathers the preserving in one place—in one thing. A paradigmatic example of a built thing, which grants *the fourfold* a place, is a *Schwarzwaldhof* [a Black Forest farmhouse]. Based on this example we receive a more comprehensive understanding of how Heidegger understands the basic elements of dwelling, that is, how he interprets the essence of human living as dwelling. I shall engage this explication further in the second part of this chapter as it will help articulate and illustrate my criticism of Heidegger's notion of living. In order to better attune us to Heidegger thinking and the subsequent critique, I will quote Heidegger's interpretation of this exemplary piece of architecture at length:

> Let us think for a while of a farmhouse in the Black Forest, which was built some two hundred years ago by the dwelling peasants. Here the self-sufficiency of the power to let earth and sky, the divinities and mortals enter in *simple oneness* into things ordered the house. It placed the farm on the wind-sheltered mountain slope, looking south, among the meadows close to the spring. It gave it the wide overhanging shingle roof whose proper slope bears up under the burden of snow, and that, reaching deep down, shields the chambers against the storms of the long winter nights. It did not forget the alter corner behind the community table; it made room in its chamber for the hallowed places of childbed and the "tree of the dead"—for that is what they call a coffin there: the *totenbaum*. And in this way it designed for the different generations under one roof the character of their journey through time. A craft that, itself sprung from dwelling, still uses its tools and its gear as things, built the farmhouse. (Heidegger, 1993a, 361f)

Reading Heidegger's description of the Black Forest farmhouse, it is more readily clear what he means when he finally claims: "*Only if we capable of dwelling, only then can we build*" (Heidegger, 1993a, 361). As builders, humans must always envision the ideal of preserving and shielding against danger, and in this sense, building belongs in the sphere of dwelling. In order to be able to build in this original sense of the word, in order to bring this sparing into the unfolding of living and into the construction of the dwelling

place, thinking is necessary—this is attested by Heidegger's own "way of thinking" in the lecture, that is, this is the very contribution of the lecture. In other words, building is not possible without thinking through the essence of dwelling. For Heidegger there is thus an original unity between the three concepts *building, dwelling, and thinking* as the title of his lecture also suggests. The three are fundamentally related to one another, and if they are not understood in their unity, humans cannot learn to dwell and will remain homeless (Heidegger, 1993a, 363 f).

Heidegger finishes his lecture on a seemingly modest note by stating: "Enough will have been gained if dwelling and building have become *worthy of questioning* and thus have remained *worthy of thought*" (Heidegger, 1993a, 362). In other words, Heidegger is content, if he has succeeded in translating dwelling from a concept of little philosophical interest to a concept of fundamental philosophical significance, or better yet, to a concept invigorating thinking. It is exactly also at this point, where this chapter affirms and reconnects with Heidegger's interpretation, namely, by reiterating the importance of thinking through dwelling, but drawing very different conclusions than Heidegger.

THE REEMERGENCE OF DANGER

Just as Heidegger has successfully unfolded dwelling as the effective protection from danger, a different, less tangible, but more subtle and challenging danger emerges. A danger that threatens to block the human ability of thinking, or so I claim here.

According to Heidegger's understanding of dwelling, safeguarding and protection from harm and danger become *the fundamental traits* of being human. This interpretation is the result of careful etymological examinations, but in order to understand the context of dwelling better, I will strive to develop a response to a similar yet different set of questions: In which context does the sparing dwelling unfold? How does dwelling actually manifest itself? What takes place in the building of the Black Forest farmhouse?

To respond to these three questions, an initial detour will be helpful, which leads us to another question: What is the most habitual [Gewöhnlichste] concerning humans? A consideration of the latter question will illuminate the most basic trait of being human, yet differently from Heidegger, and thus open an alternate perspective on living as dwelling.

The most difficult thing, however, seems to be to actually question the most habitual, that which is right in front of our eyes, that is, that which is fundamentally a part of our life practices. It is only with the greatest difficulty that we may gain distance to it, which is necessary in order to pose a question and to think something through. The habitual does not stand out in any way

and typically is not noticed. Heidegger's etymological analysis, his specific way of thinking, his phenomenological investigations and the hyphens associated it, may exactly help us gain distance from what is the most habitual for human beings. Based on Heidegger's own way of thinking, we may learn to view the phenomena and things surrounding us with a more distant gaze, and thus become better equipped to call them into question and to reflect on what they have in common.

The most habitual, *das Gewöhnlichste*, concerning human beings should however remain the most questionable. The most habitual fundamentally shapes us, but without we really notice it—it is something which continually happens to us, and which we do normally not question. It is the background against which other changes show themselves—its hiddenness allows the unhiddenness of everything else. In other words, the more hidden the most habitual is in our lives, the more fundamentally it determines it, because it deprives us of the freedom of entering into a conscious and reflexive relationship with it, and thus withdraws us the possibility of changing it. This is also why it is of crucial importance to try to answer the question: "What is the most habitual, *das Gewöhnlichste*, concerning human beings?"

Despite the difficulties identified above, we may receive a decisive clue inspired by Heidegger's own elaborations, when we consider in which semantic context the word "habitual," *gewöhnlich*, actually speaks. The adjective and adverb belong to the meaning of the Old Saxon "wonôn," and by establishing this connection we return to Heidegger's path above, but this time from a different starting point (see Heidegger, 1993a, 350 f). From a starting point that emphasizes a danger and risk concerning thinking.

As Heidegger explains, "wonôn" is constituted by the meaning of the noun "habit, *Gewohnheit*," the verbs "get used to, *gewohnen*" and "live, *wohnen*," the adjective "habituation, *gewohn*," and finally the participle "used, *gewohnt*." Against this background, we can best explain the meaning of *habitual* by the adjectives and adverbs *regulated and peaceful*. So we are looking for an activity or a thing whose basic trait is "peace and regulation." This activity exactly matches Heidegger's initial elaboration of the notion of dwelling, das Wohnen.

By asking concerning the most habitual and what deprives us of questioning and thinking, we arrived at a different perspective on the basic character of being human, and thereby at an associated aspect of dwelling. This approach to dwelling has granted a reflection on the common origin of dwelling and habituation [Gewöhnen]. In other words, we may interpret the most common dimension of being human as the practice of dwelling and the physical dwelling associated with it.

The way of thinking presented here takes a different route than the one presented by Heidegger, and it has, however, generated insights that indeed

complement Heidegger's interpretation of dwelling. Dwelling opens up a field of meaning in which Heidegger first and foremost emphasizes the relationship between dwelling and building, while this chapter emphasizes the relation between dwelling, habitual, habituation, and habit, that is, between the German family of concepts: *Wohnen*, *Ge-wöhnlich*, *Ge-wöhnen*, and *Ge-wohnheit*. It is indeed possible to unite this interpretation with Heidegger's interpretation and to describe dwelling as a fundamental human activity that unfolds as *sparing, protection from danger, and creating peacefulness*. This activity is manifest in building and securing a home. Following this understanding, humans are *habitually* living in order to protect themselves from harm and danger.

It is now time to go in further debt with this association between dwelling, habit, and safeguarding that has emerged. From the point of view of this interpretation, human beings are first and foremost striving to regulate their lives and to establish it in accordance with *habits*.[1] In this sense, human beings work to overcome the contingency of life and to replace it with fixed behavioral patterns. In order to better understand human living in accordance with the concepts of habit and protection against danger, we shall try to answer the three interrelated questions: How does humans exercise this regulation? How is living as dwelling carried out? And how does living as dwelling clear the ground for habits—how does this activity inhabit the earth?

The answer to all three questions depends on an understanding of dwelling in the sense of building a safe place to live, and thus to understand dwelling as a technique for turning the ground into a stable place, a controlled environment. According to this elucidation, humans strive to overcome the contingency of weather and of circumstance by cultivating the land. Based on insights into not least metrology and astronomy, the farmer comes to understand the seemingly disordered weather as a phenomenon that corresponds to a regular pattern of seasons, and the invention and handling of technologies has helped the farmer regulate the harvest accordingly.[2]

From a phenomenological viewpoint of everyday life, the cultivating praxis of farming manifests itself as sowing, irrigating, drenching, plowing, nurturing, and harvesting. All these activities aim at making the crops controllable and counterbalance the contingency of the weather and soil. The cultivating praxis spans from the nearest environments of the farmhouse to the furthest regions, that is, to everything that grows, to all beings. Living as dwelling ultimately means to make everything manageable and possible to control in order to reduce danger and to be able to live in peace. In other words, the immanent aspiration of living as dwelling aims at compartmentalizing life, seizing all things, and in this sense dwelling is not restricted to architecture in a narrow sense.

A second dimension of living as dwelling is now also easier to understand. This aspect becomes apparent in association with Heidegger's early

work *Being and Time* and the concept of "One's self," *das Man*, and what Heidegger calls "Everyday Being" (see Heidegger 1996, 150 f). The notion of *everyday being* translates very well to what we above have called the *habitual* being of humans. The habitual human being not only describes how human beings first and foremost are, as we see it unfolded in *Being and Time* (Heidegger, 1996, 110 f), but based on the previous interpretation, we may also view the associated form of life as the ideal of being human. This affirmation of regulation and control inherent to *das Man* is noticeable in the fact that the calculable, predictable, available human being appears to be a normative goal. However, in the hands of *das Man*, "overnight, everything primordial is flattened down as something to be manipulated [. . .] which we call *levelling down of all possibilities of being*" (Heidegger, 1996, 119).

The normative aspects of living as dwelling are far-reaching. The concept of norm derives from what we *normally* do, that is, that which is habitual. In other words, what human beings see as the good and the right thing to do comes from what is habitual and normal. There is in this way even an appeal toward living as dwelling in the sense that it shapes what human beings are supposed to do. In the light of this interpretation, our species live with the imperative to control itself and the surrounding world.

Living as dwelling is indeed directed toward the environment, but this activity only seemingly leaves the environment in accord with its own essence. When humans intervene in the environment in order to build and protect itself, it is instead challenging nature, it carries out an act of violence that levels down and control for the sake of securing a stable place for human life to unfold. The contemporary concept of the Anthropocene testifies this (Steffen, 2011). Living as dwelling is ultimately to be understood as controlling, which conversely defines what Heidegger sees as the extreme danger in *The Question Concerning Technology* (Heidegger, 1993b). The important difference is only that Heidegger connects this extreme danger with modernity, whereas the interpretation of dwelling above is more radical as it connects this danger to the sedentism of human beings in connection to the Neolithic Revolution (see also Riis, 2011b).

In *The Question Concerning Technology*, Heidegger tries to establish a sting of thoughts according to which danger and the emergence of a saving power are inherently connected (see also Riis, 2018). According to the present interpretation this is to give false hope and reason for optimism, because the danger of dwelling is not experienced as such in our everyday being, but as an increase in comfort and safety, that is, as the opposite of danger.

Heidegger's own account of the Black Forest farmhouse, der *Schwarzwaldhof*, confirms the understanding of living as safeguarding and control. It is now time to reread Heidegger's description of the typical farmhouse in the Black Forest. Heidegger's own description clearly manifests

how controlling and safeguarding operates as dwelling (see the passage quoted earlier: Heidegger, 1993a, 361f).

The paradigmatic dwelling of the Black Forest farmhouse is built and furnished in such a way that it protects and safeguards the life of the human inhabitants. As we can see by way of this example, the farmhouse is to be understood as the material manifestation of dwelling. The wall, without which there would be no dwelling, is a shield, a protective fence that shapes a shell around the inhabitants. Similarly, we cannot imagine this house without a solid foundation. And the foundation is the rootedness and the orientation of the dwelling that places the life of humans in a safe area and gives the attached humans a stable starting point for their life. From this base the inhabitants can discover their environment, take control of it, and harvest its resources. The dwelling is the supposedly Archimedean point from where humans change the world.[3]

Taken to the extreme, the meaning and direction of living as dwelling today manifest itself not least in the so-called *smart homes* and the *Internet of Things* (IoT). Through a number of "smart" devises, the new and innovative human dwellings are now becoming more and more controlled environments to the extent that they practically strive to automate our life by cooking for us, entertain us, regulate the interior atmosphere, and meticulously protect us from strangers and dangers.[4] At the macro level, living as dwelling reveals itself in IoT that seeks to connect every-thing in the world and make it available, so that humans can better regulate all things and create a safe and resilient world. As IoT expert, Greengaard, frames it:

> The Internet of Things connects humans and machine intelligence in new, entirely remarkable, and sometimes scary ways. It can make sense of the motion between and among things, including people, animals, vehicles, air currents, viruses, and much more. It can recognize relationships and predict patterns that are far too complex for the human mind and senses to grasp. (Greengard, xvi)

See also Orit Halpern et al.'s critique of the former chairman of IBM, Sam Palmisano, based on Palmisano's description of the IBM grand vision of IoT:

> IBM, he argued, would lead the globe to the next frontier, a network beyond social networks and mere Twitter chats. This future world would come into being through the integration of human beings and machines into a seamless "Internet of things" that would generate the data necessary for organizing production and labor, enhancing marketing, facilitating democracy and prosperity, and—perhaps most important—for enabling a mode of automated, and seemingly apolitical, decision-making that would guarantee the survival of the human species in the face of pressing environmental challenges. (Orit Halpern et al., 107)

Through the double exposure of traditional and high-tech living, living as dwelling now more clearly stands out as an activity that seeks to bring about control and safety and protect us from danger. To sum up, we can say that the dwelling human being ultimately seeks to safeguard herself from danger. However, by trying to protect oneself through dwelling in order to live in peace, one also prevents certain extraordinary ways of living. This is just mentioned here in advance, but I shall return to this point below in the third and final section of the chapter.

So far, it has been explained in detail what living as dwelling means in the sense of how dwelling literally takes place, inhabit the earth, and how it challenges its surroundings. If we now take one more step in the investigation of living as dwelling, we discover another aspect of what motivates and constitutes dwelling. We have seen how humans dwell in order to overcome contingency and take control of life, or, to put it differently: to spare oneself. But *das Man* can only take ultimate control of life if he can break with and control its inevitable consequence, its inherent logic. The ultimate consequence of life, the ultimate danger, is death. Death is the opposite of the safeguarding called for by living as dwelling. In this sense, the foundation for living as dwelling is closely connected to anxiety of death, and we may thus connect the goal of living as dwelling to the overcoming of death. Interestingly, as a final note in connection to Heidegger's interpretation of the *Schwarzwaldhof*, this paradigmatic dwelling, this special kind of architecture, the Black Forest farmhouse shows a desire to bridge the gap of life in this world and beyond. The Black Forest farmhouse must be designed in such a way that through the 'Herrgottswinkel' [the alter corner] and the 'Totenbaum' [coffin] a connection, an alliance so to speak, is established between the dwellers and life after death—between the immortal divinities and the human dwellers, which shall help *secure* and *protect* against death. To the living human beings the anxiety of death means that they should strive to bring everything under control including death; only this way will they ultimately be able to live a life in peace on earth.

DANGER, HOSTILE ARCHITECTURE, AND THE RETURN OF THINKING

According to my interpretation and in contrast to Heidegger's claim, living as dwelling poses a special kind of danger and should not be viewed as an attractive goal for human existence. Heidegger's portrait of the dwelling human being shows basic elements of human life and how it normally takes place, as a lifeform that is fundamentally contained and controlled.[5] The future dwelling of *smart homes* only enforces the accompanying dangers of dwelling.

Previously we have seen how dwellers strive to seize control of their environment so that they can better spare and protect themselves and live in peace. The associated peace, however, comes at the expense of thinking and authentic living. Here, in the last section, I briefly want to ponder the question of whether the physical and mental confinement of the human dwelling is the only possible way for human beings to live. Is there a way for humans to overcome life as dwelling and break the connected mental and physical barriers and walls and live in a fundamentally different and unprotected way?

Let us return to the understanding of death, which leads to the pursuit of protection manifest in dwelling. Death defines the temporal limit of beings—as such it is a principle of negativity. With death, the conditioned nature of every-*thing* comes to the foreground. Death is the negation of the homely and comfortable, *das Un-heimliche*—it remains a stranger, who always threatens to break our ordinary relationship with other beings.

The human being who goes against the urge to dwell, to safeguard everything, and instead destabilizes and exposes herself to danger, leaves the realm of the ordinary, exits the *common place*, and the controllable relation to beings, and leaps into a fundamentally different relationship to her environment.

This is a step into *ex-istenz* in the sense that existence belongs to the meaning of *stepping outside* and may thus be literally connected to the phenomenon of leaving the dwelling place and enter the "open" (Duden, 193). The *existing* human being realizes an extraordinary possibility of being human—a possibility that excludes the traditional understanding of living as dwelling and releases herself onto a kind of nonfoundational nomadism. A lifeform, which does not come to peace at one place, but is constantly awakened, changed, reoriented, and encouraged by the open. Thought of this way, existence is a perpetual astonishment over one's own surroundings without the urge to control and nail it into fixed categories; it is the overwhelming glimpse of the open and undomesticated land. It is living as *exposing* instead of *protecting*, as starring into the abyss instead of constructing protective walls against it; it is a lifeform of playful thinking instead of one-dimensional securing. Thinking, as opposed to what can be called "problem-solving" in a *Kuhnian* sense, has a more deconstructive meaning as it does not accept traditional "building blocks" of reasoning, but questions supposedly substances and essences, points out ambivalence, subverts the compartmentalized taken-for-grated lifeform, embraces the uncanny, and strives to create new experimental beginnings. "Problem-solving" in the sense of Thomas Kuhn, on the other hand, accepts the traditional concepts and tools of thinking defined by a single paradigm of theorizing (Kuhn, 1996), and it leads to the extensive theoretical architecture of science.

By trying to understand a deconstructive and alternative way of living, the concept of *hostile architecture* may actually also be of help. *Hostile* is

etymologically and phenomenologically related to being a stranger (Rey, 2004, 1743f). On the face of it, hostile architecture makes a place difficult for humans to inhabit, and estranges them.[6] This kind of architecture may take the form of cityscapes without benches and places to rest, the *nonplaces* analyzed by Marc Augé,[7] or of something like the city park of avant-garde artist/architects Arakawa and Gins in Tokyo and their Bioscleave House on Long Island that distorts your habitual sense of balance and makes the inhabitants feel like strangers.

Hostile architecture is designed to go against dwelling and feeling at peace. In an ironic way and with the help of Don Ihde's insights from *Ironic Technics* (Ihde, 2008), *smart homes* may indeed—especially in an initial phase—serve as vehicles for generating estrangement and more hostile surroundings. Bugs, bizarre standardizations, and wrong implementations of the new devices and software of the *smart homes* may in fact lead to the dismantling of comfort and peace in the houses. In this way the homes become disrupted, disturbed, and dysfunctional: you may get locked out or hacked, the light can go on in the middle of the night, and go out when you need it the most, the robot lawn mower may destroy your newly planted flowers etc. The result of this disequilibrium is exactly that the inhabitants are thrown off balance, and—get a glimpse of—how their surroundings usually direct their lives. These are at first negative withdrawal experiences, but they may also lead to an appreciation of this kind of irony of life, and of seeking more contingency and exposing oneself to a lifestyle less protected in the wild. In in this subversive sense, we may agree with Heidegger and Hölderlin: "But where danger is, grows//The saving power also" (Heidegger, 1993b, 333).

If human beings overcome the urge to dwell, they are no longer determined by the compulsion of securing and safeguarding. A nondwelling living does not plan to build its own cage, ultimately leading to a living kind of sleepwalking that extinguish the ability of thinking in the Heideggerian sense. While the dwelling person does everything to be protected and to live in safety, the existing human being welcomes uncertainty as freedom. She risks her life by exposing himself to the unknown and unprotected, but gains her life back as more intense, invigorating, and conscientious. Against this backdrop, we can summarize these insights by stating that the dwelling human being hands herself over to *das Man*, while the existing human being leads her own unpredictable life, exposing herself to thinking and practicing the ultimate openness of being.

NOTES

1. In this sense it is possible to view the house as a kind of "nomological machine" creating fixed patterns of behavior (see Cartwright, 1999, 50).

2. See also Sonia Cole on the fundamental Stone Age transformation of human culture from nomadism to sedentism also referred to as the Neolithic Revolution (Cole, 1970).

3. To connect the Neolithic Revolution with the concept of the Anthropocene, see "The Anthropocene: conceptual and historical perspectives" (Steffen, 2011, 847).

4. See, for example, *smart homes* (Smart Home, 2019).

5. In another lecture on living, Heidegger presents a different notion of dwelling from the one unfolded in *Building Dwelling Thinking*, which may be seen as closer to the present critique of living as dwelling. We shall not go into this lecture here as it does not take account of the etymology of dwelling, but rather reflects on Hölderlin's understanding of human existence (Heidegger, 1994).

6. See also Robert Rosenberger *Callous Objects: Designs Against the Homeless*. University of Minnesota Press. 2017. Rosenberger describes many interesting examples of hostile architecture. His focus is however on how this architecture is used to fend of homeless people, that is, strangers, that so to say is its *normal* usage. We may indeed also interpret this way of using hostile architecture as an extension of *normal* architecture as it is defined by the same urge of seeking to domesticate the environment and to shield off against danger.

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Chapter 11

Heidegger, Bachelard, Building

An Amateur Architect's Buildings

Don Ihde

It all began in Kansas, as my birthplace. Many already know that I went to a one-room country school, by horse, the school named "Walnut Grove," and indeed there was across the road a small walnut grove. My father sometimes cut trees there and made them into lumber, and I, like all farm boys, was learning many skills like carpentry, building, and later welding, along with bricolage inventions, jack-of-all-trade skills needed to live in the late 1930s and 1940s of a Kansas Farm.

Years later, after an MDiv (1959) and a PhD (1964) in Massachusetts, and a brief stint as a painter during both graduate schools, exhibitions and sales of thirty paintings, allowed an initial purchase while doing my PhD of 56 acres of Vermont woodland in 1961, later adding a 10 acre and a 2.5 acre purchases, I then began my amateur architect experience. First, as a poor graduate student, I could only spend $98 on a Sears chainsaw to cut trees (free, since on the property) from the site on a cliff overlooking "Carpenter's Brook" which bisected our new woodlands, to build first a one-room log cabin, 1963. And while it was there, to the light of kerosene lamps, that I read my first Heidegger—but knew nothing of his own hut, which after two more summer's building became, in my case, two small log cabin bedrooms—this was my cabin to be roughly Heidegger Hut size. Building had started in 1963, completed in 1965, and this cabin still exists today, far back in the woods.

Very hard to reach or find, but the oddest memory comes regarding the pair of strong Dalmatians who helped us in the building. Necessity allowed us to drive up to the end of a meadow; park the car with regular lumber from a local sawyer, for floors and roof rather than logs. Our dogs, with boards strapped on each side, helped go through the woods a good distance from our parked car to the building site. They, and a few buddies from MIT got the cabin built and completed just in time for us to head to our first post-PhD post in distant

Figure 11.1 Ihde's Log Cabin Hut. *Source*: Photo by author.

Southern Illinois University. Much later I learned of Heidegger's hut, learning of it and his turndown of a call to Berlin, in Adam Sharr's marvelous, illustrated book, *Heidegger's Hut* (MIT, 2006). Heidegger did much of his midlife writing in this small hut, preferring to stay in the Black Forest to—for *him*—a move to what he considered to be a scary central city, Berlin, telling why *THE PHILOSOPHER* preferred the country hideaway to Berlin. He did much of his composition in the Hut, even preferring it to his large study in his town house.

Meanwhile, once settled in Carbondale, several days drive to Vermont, my family and I would spend summers in our little cabin for ten years until building a large, summer house. During those ten years we collected a very thick file of house designs and I was also reading Heidegger on building and dwelling—but while he made me "feel good" about a sense of *heimlich*, as I was to learn much later, no guidance suggested what specific kind of design would work. His larger city house, designed by his wife, Elfrida, had a study at the head of a grand stairway—she thought visitors should have to walk up to meet the great man. And although, by 1964, I had a full salary—I look back today, appalled at this $7,425 starting salary—it would support saving only a little for a very modest building. So, designs considered were modular, sometimes Swiss mountain style houses, but highly varied, until I started to read Gaston Bachelard's *Poetics of Space* (English, Orion Press, 1964), which described

an emotional aura associated with basements to attics and but imaginatively suggesting how a house should feel, and what kinds of rooms it should have. And now, after the decade of summer commutes I began to realize that a house should also take account of the geography, weather, and locale of its location and so, gradually, I began to focus upon the old New England salt boxes, many of which still existed in Weston. Windows should be plentiful and face south; a short south-facing roof; a longer north-facing roof, and ours to be a 42′ × 30′, three story (the attic quite large), cedar sided, cedar-shingled house higher up the grade from the cabin but still above the brook. And while I did not need either a drawing or building permit for the cabin, Weston now called for a drawing and permit for what it would class as a "camp" since it would initially lack electricity or a plumbing system. We would acquire a kerosene refrigerator, a composting toilet, a submerged stove outdoor heated bathtub, and I had a solar-powered laptop. A large kitchen "L" was situated to the west of the rectangular larger part of the house, with a large woodburning cookstove. My helper builders were to be my children (a boy and two girls: Eric, Leslie, and Lisa), and occasional visitors, most notable Jerry Handler and family, an anthropologist colleague from SIU and his family.

First, the site and basement: Our site was far back in the woods over the brook, I had hired my favorite Vermont bulldozer driver, Tink Williams (now deceased), to make a road to the site, across the brook, never bridged, and the relatively flat site which nevertheless had a small slope. But miraculously after bulldozing the 42′ × 30′ foot basement hole, dug by sight, and when done, precise measurement showed that one end diagonally measured from the kitchen "L" to the farthest corner of what would be the living room, varied only 3 inches off level, an accuracy hard to believe, but which illustrated the embodiment skills which even large machinery drivers could develop, an illustration for my philosophy of technology for which I had just first published articles by 1974. Later came the cement trucks, literally pulled up the hill by Tink's 'dozer', and the concrete, when solidified, leaving a vast open gap to place locally cut trees as a frame for the first floor. Eric, then eleven years old, looked doubtful and told me, "Dad, we can't do this!" He looked at the 30′+ trees to be used to span the basement. So, now reverting to my father's lessons, we placed two large boards up the kitchen side, as a ramp, then with rope winch coils, rolled up tree after tree, spanning the 30′ gap, so after the first day, Eric now pronounced, "Dad, we <u>can</u> do this." Next came the framework for what would be a very sturdy "post and beam" construction. Using a local lumbermill, the posts and beam pieces, quite large and heavy, previously logged from old hemlock trees (cut from the property) were hoisted into place with a post triangle and rope pulley system (the pulley system had been left in my Long Island house by the previous owner; it had been used to build the 1905 Van Brunt Manor).

Figure 11.2 New Studio-Garage Workshop Addition. *Source*: Photo by author.

As noted, we purchased the Van Brunt Manor a year after moving to Stony Brook University in 1969. Jim Van Brunt had left the rope winch and the rope pulley system I was to use in Vermont; in kind, in design, it could be traced back to the simple machines of the Greeks and thus, no doubt, would have been approved by Heidegger. Later with Handler's help, we rose to the second and third floors; finally when "topping out" I placed a small conifer on the peak of the roof—only to see a mouse later crawl up to sniff it!—shades of many animals to visit us over the years. These included many relatives of the mouse; our cats were always busy; add bats, one caught by Nenya, our Siamese while in flight; a least weasel who liked our lamb bone, dragging it across the kitchen floor; a family of flycatcher birds who took advantage of a winter blown-open window to build their nest in the kitchen ceiling (allowed to stay until the young were fledged), and a raccoon who attempted to find a way into our barn door (a double, open with a top half well above the level of winter snow).

As noted, work on the saltbox began in 1974 and it was completed in 1984. The last big project was the chimney and fireplaces, built of cement blocks and stones from the stream; all hand loaded and hauled with an old four-wheel drive Broncho whose final 'burial' off the side of a halfway parking lot took place after the house was finished. Looking back it is hard to believe I did this all myself.

Think of this: basement, up three stories with a chimney topped out at the tip of the roof—the fireplace, following the design of Count Rumford, a New Englander named a Count by the Brits, specially cut from local VT soapstone,

Figure 11.3 The Completed Saltbox. *Source*: Photo by author.

shallow but wide enough for a 36″ log, with antidraft shelf, as efficient (but no fireplace is really efficient) as possible; opposite, on the dining room side, a vaulted space for an iron stove, all wood heating. (Years later, 1988 in Italy, we had medieval designed fireplaces in our Canonika old house, but while burning wood prodigiously fast, little warmth was obtained.) But this was tough living—the house would have 'outdoor temperature' on ski-trip arrivals by snowshoes, until finally hours later, warmth enough to shed one's coats. No wonder summers were favored, although the 1969 move from Illinois to Stony Brook on Long Island made the trip much shorter. Summers also saw many guests, no longer asked to help build things—indeed, the only other buildings were my study, high on another mountain with large windows donated from an earlier Cambridge house renovation while still in graduate school; lived in one summer by my daughter and her family, a small woodshed of log frame and shingle roof, all of the simplest designs. Guests would frequently remark that such a solid house would outlast anything else I could produce (such comments received with chagrin since I hoped my books would outlast the house—which they have).

Then, on return from a year plus in Australia, (1990–1991) New Zealand, Fiji, and Hawaii, we spot, in the leafless winter, a very large house had been built on the top of our west mountain. The Breed family—later we learn he

was the inventor of the air-bag explosive device, a multimillionaire whose nineteen factories supported his life style—had built one of their many vacation homes within our sight, but to their chagrin, within 75 feet of my tall Landgrove trees blocking their easterly view. That was 1991, which began a four-year process which ended in a move to our new Vermont "traded" location, still in the Town of Weston, but at another location, up above the Trout Club. The four-year story is long and complicated, but by late fall, 1995, we had agreed to a "trade" which saw us move into a modernized (modern heat, electrics, heavy insulation) 1832, but upgraded, Cape Cod house, a large acreage with trout pond, orchard, and half of Weston's tallest mountain, surrounded on three sides by the Green Mountain National Forest. With property-closing just days before the first snows (and thirteen, four-wheel truckloads, my truck and a neighbor's) of belongings going from the saltbox to the Cape Cod house (followed the very next day by a foot of snow). The new place allowed us to continue a long practice of x-country skiing, gardens, and now apples and maple syrup to top it off.

The "trade" of places did not have a happy ending. A few years after our trade, Linda , Mark (then 12) and I decided to visit the old house. When

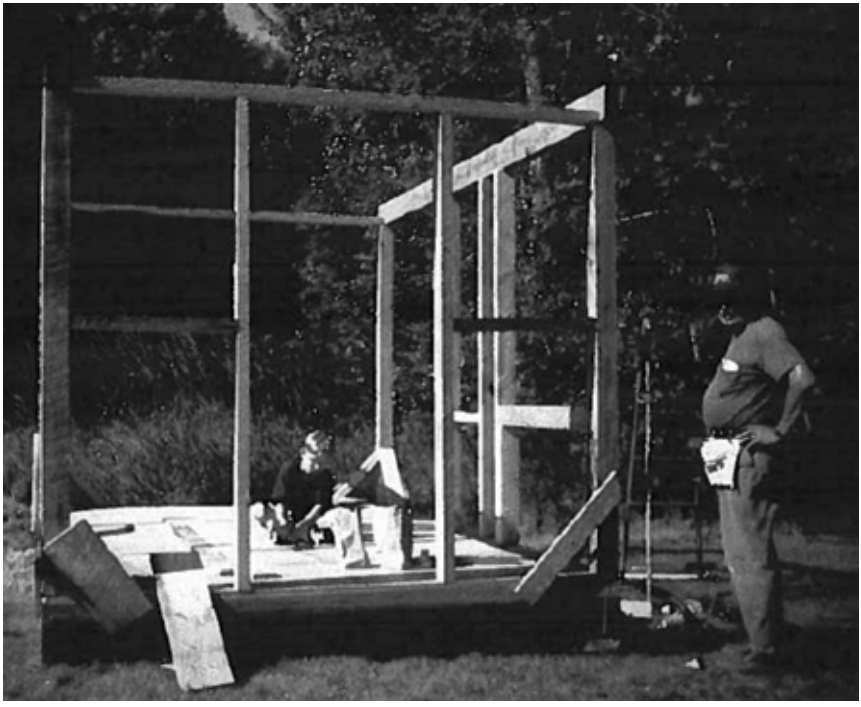

Figure 11.4 Mark and Don framing Linda's garden shed. *Source*: Photo by author.

we arrived, we found it demolished. This was twenty-three years after the house's original building time, and Eric's earlier "We can't/ we can" remarks. After viewing the demolished house, Mark penned the following poem:

"Elegy for the Untouched."
I sat in the backseat
Happy,
As I got off, I remembered
I remembered the time that I took the boundary walk with my Dad
All different types of forest comforted me as I went
I remembered the time that I got lost and my brother found me
Just a couple of yards from safety, I was deluged in another world.
I remembered the time I climbed the climbing tree as far as I could,
And then came down and congratulated myself:
That was a look into childhood.
I remembered the walks I took,
The adventures I had,
I remembered the ice-cold stream,
always flowing, like immortality.
I remembered the mossgrounds, hidden among the trees;
It was a haven for me, always soaking me with energy.
I remembered the nights
The stars kissing me good night,
The moon tucking me in.
I remembered the house.
It was glowing with warmth,
The cracks and holes, always letting me be an invisible eye.
Then I saw the house,
It was collapsed, parts of the inside you could see.
It showed me the truth of now.
As I ran away, the long way,
I ran away from truth and reality
I ran away from now, into the fantasy.
I sat in the back seat
Weeping.

Mark is now gone, forever, since January 4, 2012; Linda and I both retired that June, and now live in Manhattan, but still also spend time in Vermont. Two worlds, vastly different but nice existential variations.

I had earlier mentioned that during graduate school I painted with oils a lot, a practice I abandoned by 1970. But later, upon seeing and being

impressed with a retrospective of Andy Warhol's exhibit of "Famous Jews" at the Jewish Museum in New York, I was motivated to return to painting. First I did my "Ihde's Famous Philosophers," people who were previously "roasted" in my technoscience seminar. I initially exhibited this at my retirement conference in 2012. By now a dozen have been sold, and four remain. So, architecturally, this now called for a studio in Vermont, added to the Cape Cod, in 2010. After first having my permit location rejected (drawing OK), upon finding that the new conservation requirement called for a 150 foot backspace from the road, which would have placed the studio far back under power lines, the selectmen helpfully suggested I claim a "grandfathering" by attaching the new addition to my existant house, which called for only 45 feet of backspace. So, again reverting to post and beam and local wood framing, and again a saltbox roof, this time to be built by my excellent Vermont carpenter, Gary Bockencamp (now myself too old—seventy-six—and creaky to build by myself), we did a two-story garage wood workshop with a nice, large open studio on top with skylites, many windows, and a five mountain range view.

Now summers are split with writing and painting with philosopher's portraits supplanted by animal portraits and other projects, including sheet metal sculpture paintings inspired by Picasso. Earlier, my now deceased younger son and I had also built a garden shed and a play shed up in the mountainside (both with the help of Mark, in the mid-1990s). Meanwhile, before retirement, back on Long Island, I had earlier designed a "playroom" renovation of a front porch, and post-Australia, a new long living room harborside, both designed to mimic the classical Greek revival style of the Manor. Many compliments that the result looked as if it were originally followed.

POSTPHENOMENOLOGY AND ARCHITECTURE

It would not take an informed reader to note that all the designed and built buildings have little to do with postphenomenology. In part, this tale is simply autobiographically historical. Most actual buildings were done before "postphenomenology" gelled since the mid-1980s. In a long look back, my designs and buildings were quite *traditional* and contexted into the culture, history, and locations of their sites (Long Island and Vermont). Materials in Vermont, mostly quite local, were central.

I have already remarked on the lack of direction which came from Heidegger, although the critical reader may find my "traditionality" in the actual buildings telling; more came from Bachelard who provoked with his poetics, imaginations of how buildings and rooms would feel. And even farther back to my Kansas youth, I will never forget how the six-room, classic

"ranch" one-story house I grew up in, forever contrasted in my memory of the two-story farmhouse of my Ihde grandparents and the mystique of a second floor remained in my memory (that could perhaps foretell the third floor's large attic bedroom of the saltbox).

The chronological history of postphenomenology, in my sense of it, is easy to tell. The first glimmer came from my lectures on a "Non-Foundational Phenomenology" given in 1984 in Goteborg, Sweden, later published in 1986 by that university. It was my adaptation of Rorty's antiessential and antifoundationalism from pragmatism to phenomenology. Feeling that name, "Non-Foundational," was too complex, my *Postphenomenology: Essays in the Postmodern Context* (1993) gave what has stuck as the method's name. Later, since naming frequently comes later than practice (the term "science" replaced "natural philosophy" only in 1834, after two centuries of "natural philosophy"). But as the historically minded might note, my first published articles on technics were in 1974, just as the saltbox was begun. But if ideas take shape before given a name then most obviously was the antitranscendental and multistability proclaimed in *Experimental Phenomenology* (1977), much earlier than the name, postphenomenology, still later extended to much more complex phenomena such as variant long-distance navigation systems (European/South Pacific) discussed in *Technology and the Lifeworld* (1990), and today common in various sciences, as well as represented by several disciplinary applications, including architecture in this volume.

Variations (derived from Husserl) and multistabilities (derived from Ihde) obviously are of use to architecture and its long history. Its history, often a war of different "schools" such as the contrast between the Bauhaus and Postmodern architecture, is also a history of multistable designs, whether in major differences as above, or minor, Greek Revival (my Van Brunt Manor) compared to classical Greek design (Heidegger's favorite Greek temples, which by the time of his romanticization of stone examples, had evolved from earlier wooden ones, with all the main woods of the Mediterranean long since decimated).

But large questions emerge with the notions of multistabilities. Today I would note that the *Experimental Phenomenology* breakthrough with its larger number of perceptually verifiable of ambiguous drawings, were "linear" or "horizontal" in that the series of five I illustrated for Necker Cubes, were all equivalent. (And all can be built as 3D models. I have an old suitcase of models I, myself, built, in Vermont.) The much more complex cultural praxes of long-distance navigation in Europe compared to the South Pacific in *Technology and the Lifeworld*, both of whose roots go back several millennia, both were used successfully in the discoveries of the New World and all significant Pacific Islands long ago. This use, well before the accurate and precise imaging technics of today, was also roughly equivalent. But neither

can match the "smart bombs, robotics, or distance sensing" of today. My point is: multistabilities take many shapes and not all are equivalent.

I want to end with some concrete examples, first from antiquity.

Pyramids:

- Pyramids exist in many, many places. Everyone knows of Giza and the pyramids of Egypt, sited in relation to ancient astronomical observations, basically tombs for aristocrats, Pharaohs, the very rich, and still more are being found yet today. Our first visit to Egypt was in 2011.
- But we have seen pyramids also in Asia—China and South Korea. Smaller, but also monuments to kings, emperors, priests, and the aristocrats of ancient times.
- Then, in 1996, I visited the largest (by volume) pyramid of the world—in Cholula, Mexico. It is buried under a human-constructed earth mound, actually three pyramids, each larger and built upon its predecessor, topped by a Spanish-built church built by conquistadors, unknowing of the pyramid below until an earthquake in 1911. I was proud to identify the unusual echo of clapping hands in the ball court as the song of the quetzal bird, later reidentified by both an acoustic engineer and an anthropologist. Today the guides (we revisited in 2014) regularly identify the clap echo as the sound of the quetzal (actually taken as Quetzalcoatl, the mythical bird-serpent who is the raingod of antiquity, and whose statue has been unearthed since my 1996 visit). But few know of the 8600 more buried pyramids revealed by magnetometer surveys in the 1990s. And like the spread of plant and animal domestication after the Ice Ages, there is no evidence that pyramid design was spread from any one originating location.

Capital or Monumental Cities:

- As with pyramids, in which case I visited Cholula before Giza, thus reversing the Euro-American master narrative, my first monumental Capital City was Darius' now ruined Persepolis in Iran, in 1999. Its bas reliefs of lions, bulls; its columns and partial buildings, unknown to me yet in comparison to the Greek Parthenon, were actually roughly four times larger than its Greek counterpart.
- Later, on seeing the Parthenon, I realized it was a sort of miniature Persepolis, although Greece's army defeated Darius'.
- The hidden and secret cities of Korea and China, again similar but close to the same size and majesty, displayed the gardens, palaces, and secret places for ancient royalty.

Gardens:

- The "Hanging Garden" of Mesopotamia (8300 BP) was notorious for its need of lifting water in this arid land.
- Sargon, whose mother sent him down a river in a Moseslike tarred container, later became a king (his famous garden dates 3600 BP).
- Greek and Roman Gardens were often closely associated with religious gods, smaller and mostly suburban.
- Japanese gardens, closely associated with emperors, forbad artificial ornaments, had fashioned plants, stone structures, 700 BP on.
- Chinese gardens, fairly widespread, highly geometrical with box-shaped divisions.
- Indian gardens, elaborate, often associated with Buddhism.

I have elsewhere noted that there are many depictions of gardens from an overhead or "bird's eye" perspective, many different cultural examples often pre-date "Renaissance perspective." But all the above examples of monumental architecture, gardens, are mostly associated with royalty, the aristocratic elite, and priestly classes. The monumental size of these structures, usually built of stone, often assured such ruins could last for millennia, whereas smaller and nonstone structures were less likely to survive. Today's precision imaging technologies are beginning to expand discoveries to smaller and more fragile structures. Many recent discoveries today are made from deep jungle penetrating devices such as LIDAR, ground penetrating radar, and infrared photography, with various new finds particularly from Brazil. (Recent finds sometimes relate to animal behavior, including termite mounds recently discovered, covering an area equivalent to the entire UK; flaked stone, now known knapped by Capuchin monkeys who lick the stones for mineral deposits, instead of using them for tools, examples of which can be dated 40,000 BP—these artifacts were once mistakenly thought to evidence early human arrival! Videos of contemporary Capuchin knapping and licking activity disproved that.)

POSTSCRIPT

In conclusion I would intimate that postphenomenological multistability implicitly argues for a multiple, nonprivileged set of trajectories for architectural design. It is obviously multicultural in flexibility. And I confess, were it possible, that I would like to, but given my age am unlikely, to build one more building. It would be a totally "green" house, fully energy efficient

and taking into account the coming change of climate. We did solarize the saltbox in our last years of use (wonderful results) to which today I would add a geothermal heating and cooling system, probably continue a compost toilet system, bigger tri-paned windows and massive insulation, with termite modeled air circulation. But in reality, I will likely compromise with more window upgrades and maybe a wood-heating system in my studio. And I hope to keep up with my otter visitors and have a few more trout dinners from the ever active and lively pond.

Don Ihde, amateur architect

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About the Contributors

Charley Appleton

Charley's academic training began in the biological sciences, dove into various fields of philosophy from ethics to postphenomenology, and culminated with public policy. Their time at Arizona State University (BS, MS) led them through environmental studies and into pragmatism, leading them to synthesize these areas of thought into doing philosophy of alternative transportation policy with an eye toward the simple bicycle at the Georgia Institute of Technology (MS). In tandem with their academics, they have been involved in bicycle cooperatives and other areas of mutual aid direct action. Currently, they have decided to devote more of their time to these efforts.

Inger Berling Hyams

Inger Berling Hyams recently submitted her PhD dissertation at the University of Roskilde, Denmark. Her PhD project *Learning by Drawing: Architecture Education in Denmark*, apart from analysis of different architectural education practices and drawings, has an underlying interest in the use of drawing as a thinking tool in architecture education and how this has morphed into various formations historically. Her research interests are generally centered on architecture and philosophy, particularly drawing technology and mediation of thinking through drawing. Part of this interest has sparked research into diagrammatics and Deleuzian theory. Over the past few years Inger Berling Hyams has had a keen interest in the field of postphenomenology. Concomitantly with her PhD she has worked as an external lecturer at Roskilde University, and has run design and visualization workshops, and supervised a wide variety of projects within the fields of design, architecture,

digital technologies, and new building materials. Inger Berling Hyams has previously coedited the anthology Architecture Drawing Topology (AADR, 2017).

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Ditte Bendix Lanng, PhD, is assistant professor of mobilities and urban design at the Department of Architecture and Media Technology, Aalborg University, Denmark. Her research interests include STS, urban space design, mobilities design, and urban design as a mode of sociocultural enquiry. She is currently working with autonomous mobilities and urban design as a contribution to democratize futures.

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Lars Botin, PhD, is associate professor at the Department of Planning at Aalborg University, Denmark. Lars has a MA in Arthistory, with specialization in theory and philosophy of architecture. Currently he does research in digital and analogous technologies and their interrelations with humans within a Techno-Anthropological framework. He is an active member of the Postphenomenology Community. He published several peer-reviewed articles and book chapters, he has coedited anthologies on Techno-Anthropology (2013, 2015, 2015, and 2020), and recently (2020) edited two special issues in *Techné. Journal of the Society for Philosophy of Technology* on Critical Constructivism and Postphenomenology.

Adrian Carter

Professor Adrian Carter is a registered architect in Denmark, who has studied at the Portsmouth School of Architecture with Professor Geoffrey Broadbent; at The Royal Danish Academy of Fine Arts, School of Architecture in Copenhagen with Professor Jan Gehl; and at the University of Cambridge with Professor Dalibor Vessily. As a practicing architect, he has worked together with Reima Pietilä in Helsinki, Finland; Niels Torp in Oslo, Norway; Ancher, Mortlock and Woolley in Sydney, Australia; Henning Larsen and Dissing+Weitling in Copenhagen, Denmark.

Since August 2014 he has been professor of Architecture, at the Abedian School of Architecture, Bond University, Queensland, Australia. He has previously taught at the Aarhus School of Architecture and at Aalborg University in Denmark, where he initiated and became the first director of the Utzon Research Center, and was responsible for the realization of the Utzon Center building on the Aalborg harbourfront, designed in collaboration with Jørn Utzon. As an expert on the work of Jørn Utzon, he has advised and contributed to the Australian Government's Department of the Environment and Heritage's nomination of the Sydney Opera House for World Heritage listing in 2006. In 2016, he was awarded his PhD for his thesis 'The Utzon Paradigm' at Aalborg University.

Don Ihde

Don Ihde is distinguished professor of Philosophy, Emeritus, Stony Brook University, New York, USA. His latest publications include *Medical Technics* (Minn, 2019); *Acoustic Technics* (Lexington Books, 2015); *Husserl's Missing Technologies* (Fordham, 2015).

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Natalia Juchniewicz, PhD in Philosophy (2015) and in Sociology (2018), assistant professor at the Department of Philosophy at the University of Warsaw, head of Philosophy of Technology and Communication Lab at the University of Warsaw. She is interested in the philosophy of technology, new media, mobility, and ethnographic research.

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Søren Riis

Søren Riis is associate professor of philosophy and holds a PhD from Albert-Ludwigs-Universität Freiburg, Germany. He integrates philosophy of technology with STS and is interested in inquiring a wide variety of modern artifacts, their consequences and different modes of being. Riis has published in *Continental Philosophy Review*, *Social Studies of Science*,

Foundation of Science, *Heidegger-Jahrbuch*, and has coauthored the Oxford Bibliographies Online entry on philosophy of technology. Recently he published "Unframing Martin Heidegger's Understanding of Technology: On the Essential Connection between Technology, Art, and History."

Robert Rosenberger

Robert Rosenberger is an associate professor of philosophy at the Georgia Institute of Technology in the School of Public Policy. His work in the philosophy of technology focuses on the development of postphenomenological theory through the investigation of topics such as smartphone driver distraction, scientific imaging, phantom vibration syndrome, and the critique of antihomeless design and law. He is the author of *Callous Objects: Designs Against the Homeless*, and the editor of *Philosophy of Science: 5 Questions, Postphenomenological Investigations* (with Peter-Paul Verbeek), and *Postphenomenology and Imaging* (with Samantha Jo Fried).