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The Digital Turn and the Architecture of Dwelling

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Introduction

The House Gone Missing:
The Digital Turn and the Architecture of Dwelling

Dirk van den Heuvel and Nelson Mota, editors

This issue of *Footprint* originates from a simple observation: after the digital turn, the house seemed to have gone missing from architecture debates.[1] What had happened to the notion of dwelling? When perusing the digital discourse in architecture, it is striking how its main foci almost exclusively concern new production methods, especially the 'non-standard' fabrication of building elements, and different understandings of the material dimensions of architecture that are being hypothesised under the impact of the new abstracted ways of 'drawing' as an outcome of data-processing. A case in point is the work of the architectural historian Mario Carpo, who emerged as one of the most prominent voices who helped popularise the very term 'the digital turn' in architecture.[2] The urban and territorial dimensions too, in terms of networks of social spaces and smooth, frictionless streams of goods and people, are under consistent scrutiny; Manuel Castells deserves a special mention here for the concept of the space of flows as coined in his 1989 book *The Informational City*.[3] The question of the house gone missing was furthermore triggered by the impact of the Covid-19 pandemic, when early in 2020, almost overnight, the combination of social distancing, lockdowns, and strict travel restrictions together with the widely available media technologies transformed private houses into online workspaces. This global phenomenon made visible what had already become a new but unrecognised reality: that what was once conceived as a private domain of individual or collective dwelling had become something much more complicated, layered and interconnected.[4]

We don't have to go back far to reach a time when the house occupied quite a different place in the architectural theory discourse. Mid-twentieth century, when computers were only just starting to make their way into science, military operations and governmental systems of control and redistribution, the house was considered the ultimate paradigm of the architectural discipline, a veritable epistemological ordering tool. The English-Canadian historian Peter Collins eloquently ordered the history of modern architecture according to the house paradigm in his now largely forgotten *Changing Ideals in Modern Architecture* from 1965.[5] For Collins, with the event of the Industrial Revolution and the rise of the middle classes, the individual home had become both the outcome and the register of the processes of modernisation at play.

Many historians and theorists have made similar claims. Following his mentor Rudolf Wittkower, Colin Rowe famously built his theory of architectural autonomy on the taxonomies of Palladian villas and the demonstration of principles of ordering at work in the house designs by Mies van der Rohe and Le Corbusier. Beatriz Colomina, too, identified the home as the site par excellence for the redefining of architecture, stating that 'the history of the architecture of the [twentieth] century is the history of the search for a house.'[6] In parallel, housing and dwelling have been considered key territories for architecture to reconstitute its workings and values, time and time again. However, to say it was a search is perhaps too much of an understatement; the house as architectural paradigm was to be reclaimed against all

odds, against the processes of modernisation and disruptive technologies penetrating the house. The house as the site of dwelling was never quite stable, but always in danger of collapsing under the forces of modernisation.

This was also the point of the philosopher Martin Heidegger when he reflected on the notion of dwelling, as exemplified in his seminal 1951 lecture at the *Mensch und Raum* conference in Darmstadt, 'Bauen Wohnen Denken'.[7] Despite its reactionary tendency, its propositions still resonate in all debates related to housing and dwelling. Heidegger contrasted the socio-political urgencies at stake in the field of housing with those of existential philosophy. To him, dwelling was the real question, as opposed to the quantitative provision of mass housing. The reactionary overtones of Heidegger's praise of dwelling – the *domus* – have been examined and criticised, also by voices from the field of digital theory in architecture, most notably Neil Leach.[8] Indeed, Leach deploys the connections of Heidegger's proposition with Nazi-ideologies such as the *Heimat* to reject the idea of dwelling altogether as 'ill equipped' for the digital age and its new ways of being: more fluid and flexible, more complex.

Likewise, MoMA curator Terence Riley attempted to escape the shadow of Heidegger in the exhibition 'The Un-Private House' in 1999, when he aimed to rethink the house as the central site for architectural invention.[9] Just before the massive availability and impact of the new digital media, Riley proposed – as suggested by the exhibition title – to turn the house inside out, to leave behind the notion of privacy and to start to speculate on the un-private house as he saw architects doing already, from radical transparency to the introduction of media rooms and omnipresent projection screens to the recognition of a difference between the real and the virtual. Analysing late-twentieth-century house designs in this way, Riley suggests that a new mode of *Dasein* has emerged, in which the accepted distance from events and things has dissolved:

At the end of the twentieth century, the new kind of relationship to the world of events and things that Heidegger could not visualize, a new kind of distance in daily life with its own parameters and definitions, is clearly evident in the ascendancy of digital technologies throughout everyday life. In both theory and practice, the media's potential effect on space has become a catalyst for contemporary architectural innovation and experimentation.[10]

However, while acknowledging the penetration of the house by the new technologies and the concomitant erosion of familiar notions of domesticity, Riley maintains 'the problem of the house' could still be considered central to the discipline and its relevance through continuous reinvention. Yet today, almost a quarter century on, we may speak of a conflation of the real and the virtual, instead of a difference. The 'new kind of distance' has given way to a new kind of futurist acceleration, as propounded by the Californian libertarians who run the new media companies seeking to deliberately and consistently disrupt everyday life.

In hindsight, we might reconsider the house as a paradigm for architecture. An alternative reading of the propositions for the modern house suggests the house was always on the verge of disintegration and dissolution, and not the site of disciplinary reconstitution. Think of Sigfried Giedion's *Befreites Wohnen*, Le Corbusier's *Machine à habiter*, the many Houses of the Future: they all point to dematerialisation, abstraction, and the channelling of information flows. The digital turn in architecture then amplifies a tendency to techno-utopia, which was already there throughout the twentieth century.

If the house has gone missing, where do we see dwelling today? Around the same time Collins was claiming the house to be the ultimate paradigm for the architecture of the larger modern era, Reyner Banham speculated on the disappearance of the house. In his 1965 essay 'A Home is not a House', Banham considers the impact of new technologies, from information and communication systems to

environmental control, and how it will render the house, or even architecture, obsolete.[11] The essay is illustrated with François Dallegret's now famous diagrams of the 'environmental bubble', in which we see naked human bodies gathering around a technological 'hearth' that integrated all needs and pleasures, from food preparation to music provision. It's an iconic image of 1960s techno-utopia, which already has undertones of contemporary posthumanism in which technology, nature and culture are not separate domains, but are thought together and constitute a world of assemblages.

We see one tendency within architecture theory in relation to the question of dwelling as predominant and offering new possible readings; it concerns the reconceptualisation of architecture as ecological and relational. Even when ecology takes us back to the *oikos* or house, it must be an 'objectless' house, not a separate or distinct unit, set apart from other units, but part of a larger fabric. It might come close to a 'topology of thresholds' as theorised by Georges Teyssot, unpacking the concepts of ethnographers and psychologists, and retracing the architecture of such eminent figures as Alfred Neumann, Zvi Hecker and Aldo van Eyck, who explored new geometries and relationalities in architecture.[12] If we take up Teyssot's observations, we might paraphrase Van Eyck: that the house reappears as a city, coming together in a configuration of reciprocities. 'Built homecoming' as propounded by Van Eyck amounts to the provision of a 'bunch of places.'[13]

It must be said that the above observations occurred only during the production of this issue. Clearly, the question of dwelling and its various reconceptualisations has arisen in many places, outside of but always alongside and eventually intertwined with the digital turn proper. In our call for contributions to this issue of *Footprint,* we invited potential contributors to discuss the different ways in which the house have been reimagined and reconstituted, and to examine attempts to redefine notions of dwelling by exploring the intersections of the real and the virtual in the domestic space thrown up by the digital turn. The responses to the call held surprising takes on the intellectual and disciplinary framework we imagined for this issue of *Footprint.* Three themes generated a particular interest: the historical emergence of the digital turn, the reconceptualisation of domesticity, and questions of motivation and values. In the following sections, we'll elaborate further on each of these themes, discussing how the different contributors explore them.

Historicising the digital turn

Over the last two decades Antoine Picon has emerged as a key figure in architectural discourse, making substantial contributions to the ongoing discussions concerning the intricate interplay between architecture and technology. His seminal 2010 work *Digital Culture in Architecture* examines the profound impact of digital technology on architecture and the urban landscape.[14] His subsequent book, *Smart Cities: A Spatialized Intelligence*, serves as a compelling response to the prevailing praise for the concept of smart cities.[15] Picon delves into the deep-seated connection between the smart-city phenomenon and cultural paradigms, describing the ensuing consequences for urban space and everyday experiences. In *The Materiality of Architecture*, Picon offers a nuanced perspective on the ostensibly all-encompassing nature of remote and intangible experiences, positing that our world remains predominantly shaped by tangible, concrete, and spatial encounters, mediated through raw and transformed materials.[16]

Antoine Picon graciously accepted our invitation to contribute an opening essay to this issue of *Footprint;* entitled 'Architecture and Materiality in the Digital Age', it elucidates the enduring impacts of the Covid-19 pandemic, illustrating how the need for comfortable and functional living spaces has become increasingly pronounced. This heightened demand for comfortable and healthy dwelling experiences has been captured by the real estate

market, which capitalised on individuals' aspirations to enhance the habitability of their domestic realms, leading to a surge in the preference for single-family homes where ample space and outdoor areas could compensate for the loss of in-person social exchanges. Picon emphasises the pivotal role played by digital tools in sustaining social connections and professional relationships throughout the pandemic. Indeed, technology has facilitated remote work and virtual interactions, enabling people to remain connected despite the imposition of physical distancing measures. However, Picon observes that the experience of enduring multiple lockdowns during the pandemic has also served as a catalyst for recognising the irreplaceability of in-person interactions, thereby accentuating a clear demarcation between mental representations and tangible practices. Picon's essay underlines the indelible impact of digital culture in changing societal perceptions of the architecture of dwelling, but also reaffirms the enduring significance of physical presence in shaping human interactions.

Fredrik Torisson's article, titled 'The Digitalisation of Swedish Housing: The First Forty Years', delves into the concept of the smart home as an example of the interdependence between the virtual and the material within the realm of architecture. The article provides an overview of the evolution of the smart housing concept in Swedish social housing buildings, tracing its trajectory from its initial emergence in the 1980s to the present day. Torisson explains how the digitalisation and automation of Swedish housing have gradually shifted the focal point from the physical dwelling to the broader building structure, and ultimately to the inhabitants themselves. Torisson's analysis is focused on the proliferation of smart devices installed by homeowners and landlords within tenants' homes since the early 1980s. He charts a progression in which responsibility is transferred from landlords to technology corporations, and more recently, to utility companies. The article underscores the challenges associated with the advent of smart housing and the digitalisation

of residential spaces, among which are the issues of choice, control, data collection and privacy concerns. The multifaceted nature of smart housing necessitates careful consideration of these matters, as the integration of digital technologies raises pertinent questions regarding individual autonomy, the safeguarding of personal information, and the potential implications of data aggregation.

Reconceptualising domesticity

Antoine Picon's and Fredrik Torisson's articles help us to establish a brief historical overview of dwelling in the digital age. The impact of this historical process in shaping new ways of living is explored in 'Infinite but Tiny: Towards a Hybrid Architecture of Dwelling', the article authored by Georgios Eftaxiopoulos and María Álvarez García. In their contribution, Eftaxiopoulos and Álvarez García explain how the shift in the nature of jobs, from manufacturing to information-related services, coupled with the advent of the internet and the World Wide Web, made flexible work practices and telework possible. This newfound flexibility allowed individuals to work from anywhere, at any time, thus blurring the division between private life and work, and setting the background for the emergence of a massive, immaterial labour platform: the metaverse. The authors critically examine the extent to which the metaverse can be seen as a realm of infinite possibilities, where virtual and augmented reality converge to redefine how we relate to one another and to life itself. They show how the metaverse has become a key component of a trend to mitigate the claustrophobic nature of the Tiny Homes concept promoted by IKEA among others, offering a virtually infinite space to digitally dwell somewhere else. The emphasis on the qualities of the virtual obscures the real material and tangible hindrances experienced by urbanites forced to live in sub-standard conditions.

The hybridity of the architecture of dwelling discussed by Eftaxiopoulos and Álvarez García is also explored in 'Platforms and Dwelling: Topologies

of Distributed Domesticity', by Lőrinc Vass, Roy Cloutier and Nicole Sylvia. They discuss how, under contemporary capitalism and platform urbanism, the notion of dwelling undergoes transformations and extends beyond traditional boundaries. Everyday aspects of domestic life are reimagined as services provided and exchanged within platforms such as Airbnb. Simultaneously, the home is increasingly used for economic production as work infiltrates the domestic sphere. The platformisation of dwelling reverberates throughout urban space, complicating established dichotomies between interior/exterior, private/public, and home/work. The authors discuss the dissolution of traditional boundaries associated with networked forms of dwelling that result from the interplay of physical mobility and digital connectivity. Using a topological framework, the 'manifolds of dwelling', this contribution helps us understand the materialised and articulated relations in contemporary dwelling that are reshaping human agency, democratic control, and socio-political struggles.

Motivations and values

The historical development of the digital turn in housing design and the reconceptualisation of domesticity explored in the articles discussed above, requires a critical understanding of the motivations and value systems underlying the narratives that support them, addressed in this issue from three distinct perspectives. In 'Rethinking Autonomous and Robotic Systems in Residential Architecture: Assessing the Motivations and Values of Home Automation' by Sotirios Kotsopoulos and Jason Nawyn, the authors look back on the promise of digital futurism and the potential of smart technologies, reviewing two decades of exploring digitally augmented homes at MIT's Media Lab. They reflect on the implications of digitally enhanced replacements for earlier products of industry and craft, and seek to determine which aspects of digitalisation contribute to transform human behaviour and affect residential architecture. Kotsopoulos and Nawyn suggest that a careful balance to the

high-tech interventions in architecture is required, and propose that these interventions be supported by low-tech improvements in building envelopes and mechanical systems. They claim that the integration of general-purpose sensing infrastructures in the domestic space raises concerns about privacy, transparency, and the distortion of data. Instead, they argue, the focus of home automation should be on designing living environments that manage physical envelopes and systems, rather than shaping occupants' behaviour.

In her 'Housing for a Lonely Generation: Co-Living Platforms and the Real-Estate-Media Complex', Marija Marić looks into the hidden side of co-living platforms, revealing how these companies leverage storytelling techniques to construct an ideal urbanite, a networked, productive entrepreneur belonging to the global creative working class. Marić analyses the discursive techniques used by these platforms to offer a solution to the loneliness and alienation of young digital nomads, providing a housing formula for mobile professionals based on promises of community and fulfilment. According to Marić, co-living platforms are part of a real estate-media complex that commodifies housing and shapes individual and collective subjectivities. Their corporate housing model perpetuates the exploitation of precarious individuals who face the pressure to perform socially and professionally and are enticed to pay a premium to small living spaces.

The hidden side of the so-called platform economy is further discussed in 'Housing Migrant Workers: The Form of the Corporate City Along the Rotterdam-Venlo Logistics Corridor' by Renzo Sgolacchia. This article brings to the fore the role of migrant workers performing the jobs upon which the entire platform economy relies. The article examines the Rotterdam-Venlo logistics corridor in the Netherlands, a significant hub for the platform economy and migrant workers. Sgolacchia discusses how digital services are integrated into workers' housing, with corporations and public institutions utilising online platforms and applications to

manage various aspects of migrant workers' lives, including accommodation, transportation, payment, and work schedules. He argues that this digital control contributes to a hyper-rationalisation of the layout of workers' housing and amplifies employee stress. The remoteness of the housing creates a sense of alienation and nostalgia, compounded by limited mobility and reliance on technology for communication. Roma communities offer a contrasting example, with their flexible housing disrupting the agencies' coercive strategies. Sgolacchia concludes that reimagining workers' housing liberated from the surveillance and control systems to which it is currently subject could create an architecture that fosters political intermediation and action.

Unresolved questions

The contributions in this issue of *Footprint* shed light on the correlations between the architecture of dwelling and the digital age from various disciplinary perspectives. By examining the historical development of digitalisation in architecture, understanding the shifting nature of domesticity in the digital era, and critically analysing the motivations and value systems underlying these changes, the articles prompt us to reconsider the role of technology, the impact on human behaviour and social interactions. They point out the need to rebalance key notions of privacy, autonomy, and the physicality of dwellings. They also draw attention to the hidden complexities of the platform economy, migrant workers' housing, and the potential for reimagining architectural interventions that empower workers and foster political agency. The techno-utopia of the 1960s is exchanged here for a sobering view on techno-capitalism, mostly in critical terms, or as part of a larger assemblage from which dwelling might re-emerge anyway, since it is an indivisible part of human existence. There is not a call or desire for a Lefebvrean revolution, but rather a speculation on inhabitants' daily tactical negotiations to appropriate the superstructures as theorised by Michel De Certeau.

As suggested by Johan Huizinga, unresolved issues propel knowledge production. Awkwardly and worryingly, in this issue of *Footprint* the digital discourse seems worlds apart from the gender critique of the architecture of dwelling, despite Donna Haraway's groundbreaking work in, among others, her 1985 *Cyborg Manifesto*. Another related question that remains unanswered is why there is still a resistance to think of architecture, and especially the architecture of dwelling, as a piece of technology? After all, this was Le Corbusier's famous proposition: 'La maison est une machine à habiter.' Heidegger's thoughts still linger in the background of our reflections on contemporary digital dwelling. Further developing his ideas on dwelling Heidegger resorted to the poetry of Friedrich Hölderlin, especially in the essay '... Poetically Man Dwells...', which concludes with some touching thoughts on kindness, an idealist and idyllic reference to ancient Greece. The contrast with our current agitated times could hardly be starker. The piece ends with a quote from Hölderlin's last poem, 'Vista', which opens with the line 'When far the dwelling life of man into the distance goes.'[17] We want to ask again, what are we looking at? What is our view on things, and on how we inhabit the world? Has dwelling got out of reach, at the brink of disappearing here? Hölderlin suggested the perfection of nature, yet 'in that far distance'.

Notes

1. In a previous issue of *Footprint*, which centred around 'The Architecture of Logistics', the social and spatial disruptions resulting from the digital revolution were explored, but with a different focus than the redefinition of dwelling in the digital age. That particular issue delved into how logistics permeates our lives, not only influencing our living and working conditions but also enabling the very essence of existence itself. See Negar Sanaan Bensi and Francesco Marullo, 'The Architecture of Logistics: Trajectories Across the

Dismembered Body of the Metropolis', *Footprint* 12, no. 2 (2018): 1–5.

2. Mario Carpo, ed., *The Digital Turn in Architecture 1992–2012* (Chichester: Wiley, 2012); Mario Carpo, *The Second Digital Turn: Design Beyond Intelligence* (Cambridge, MA: The MIT Press, 2017).

3. Manuel Castells, *The Informational City: Economic Restructuring and Urban Development* (Oxford: Wiley-Blackwell, 1992).

4. Fiona Jenkins and Julie Smith, 'Work-from-Home during Covid-19: Accounting for the Care Economy to Build Back Better', *The Economic and Labour Relations Review* 32, no. 1 (1 March 2021): 22–38, https://doi.org/10.1177/1035304620983608.

5. Peter Collins, *Changing Ideas in Modern Architecture 1750–1950* (London: Faber & Faber, 1965), 42.

6. Beatriz Colomina, 'Couplings', *OASE: Journal for Architecture* 51 (1999): 32–33.

7. Martin Heidegger, 'Building Dwelling Thinking', in *Poetry, Language, Thought*, trans. Albert Hofstadter (New York: Harper & Row, 1971), 145–61.

8. Neil Leach, 'The Dark Side of the Domus', *The Journal of Architecture* 3, no. 1 (1998): 31–42.

9. Terence Riley, *The Un-Private House* (New York: Museum of Modern Art, 1999).

10. Ibid., 12.

11. Reyner Banham, 'A Home is not a House', *Art in America* 2 (April 1965): 70–79.

12. Georges Teyssot, *A Topology of Everyday Constellations* (Cambridge, MA: The MIT Press, 2013).

13. Aldo van Eyck, 'There Is a Garden in Her Face', *Forum* 15, no. 3 (August 1960): 107–21.

14. Antoine Picon, *Digital Culture in Architecture: An Introduction for the Design Professions* (Basel: Birkhäuser, 2010).

15. Antoine Picon, *Smart Cities: A Spatialised Intelligence* (Chichester: Wiley, 2015).

16. Antoine Picon, *The Materiality of Architecture* (Minneapolis: University of Minnesota Press, 2021).

17. Martin Heidegger, 'Poetically Man Dwells', in *Poetry, Language, Thought*, trans. Albert Hofstadter (New York: Harper & Row, 1971), 229.

Biography

Dirk van den Heuvel is associate professor at the Faculty of Architecture and the Built Environment of TU Delft, and directs the Jaap Bakema Study Centre, the research collaboration between TU Delft and the Nieuwe Instituut in Rotterdam. Notable book publications include *Habitat: Ecology Thinking in Architecture* (2020), *Jaap Bakema and the Open Society* (2018), and *Architecture and the Welfare State* (2015). Van den Heuvel has curated exhibitions, including Art on Display 1949–69 for the Calouste Gulbenkian Museum (2019) and the Dutch national pavilion at the Venice Biennale in 2014. He was an editor for *OASE* and *Footprint*, and co-edited among others the special issue of *Footprint* 'Trans-Bodies/Queering Spaces' (2017). He is an editor of *DASH: Delft Architectural Studies on Housing* and an editorial board member of *VLC Arquitectura*.

Nelson Mota is associate professor at the Faculty of Architecture and the Built Environment of TU Delft, where he leads the group Global Housing. He earned his PhD from TU Delft in 2014 with the dissertation 'An Archaeology of the Ordinary: Rethinking the Architecture of Dwelling from CIAM to Siza'. Nelson Mota is author of the book *A Arquitectura do Quotidiano* (edarq, 2010), co-editor of *Global Housing: Dwelling in Addis Ababa* (JapSam Books, 2020), and co-editor of the academic journal issues *Footprint* 17 (2015), *Joelho* 8 (2017), and *Footprint* 24 (2019). At TU Delft, Nelson is co-leader of the Global Urban Lab programme at Delft Global Initiative. He is member of the editorial board of *Footprint* and of the book series *DASH: Delft Architectural Studies on Housing*.

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