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Digital Culture – a Plea for a Critical Future

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Editors' Note

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We live in an era characterized by profound changes in the way we perceive and interact with the world, guided by the driving force of digital technologies, a phenomenon many authors have no hesitation in calling a Fourth Industrial Revolution. As diverse as these changes may be in the realm of architecture, they are inevitably embedded in a long-standing negotiation of formal codes, as suggested in Antoine Picon's *Digital Culture in Architecture* and Mario Carpo's *The Alphabet and the Algorithm*, ultimately leading Reinhold Martin to ask: "Is digital culture secular?"[1]

Despite the inevitable links with past codes, soft architecture technologies based on speculative intelligence are leaving behind what Nicholas Negroponte named "soft architecture machines," in which hardware still ruled, and opening a new era which is definitely distinct from the First or Second Machine Ages, as identified by Reyner Banham. Indeed, these digital changes are part of a deeper historical change. We are experiencing growing political instability on a global scale, in which social inequality is increasing while the worldwide urban population has surpassed the entire rural population. These phenomena have given rise to problems in urban policies, such as a lack of quality housing, social segregation, and the informal growth of cities. The evolving and nearly unavoidable phenomenon of climate change has been accompanied by

1 See Antoine Picon, *Digital Culture in Architecture: An Introduction for the Design Professions* (Basel: Birkhäuser, 2010); Mario Carpo, *The Alphabet and the Algorithm* (Cambridge, Mass.: The MIT Press, 2011), Reinhold Martin "Is digital culture secular?: On Books by Mario Carpo and Antoine Picon," *Harvard Design Magazine: architecture, landscape architecture, urban design and planning*, no. 35, (2012): 60.

a growing awareness of the effects of human activity on the planet and of the urgent need to achieve a measure of environmental sustainability. These changes all have direct consequences for the practice of architecture.

After reflecting in issue 13 on how memory can act as a catalyst for architectural thinking within the singular mind of the creative individual, the particular interest of this issue of JOELHO is in how shared and collaborative processes, driven by the architect operating within this digital culture, are motivating experimental architectural and urban practices in an attempt to confront the associated political, environmental, and social concerns. Apart from the digital turn advanced by rhetoric founded on aesthetic novelty or on innovative, conceptual ways of making, the undeniable strength of digital tools resides in how, and by what means, they might contribute to a more environmentally, politically and socially responsible architectural practice.

However, the long discussed suspicion over the digital world in architecture has been the menace towards hand-drawing and making. In 2012, the postmodernist Michael Graves questioned whether drawing is actually becoming a "lost art," when "digit" – meaning "finger" – has been replaced by "digital" – relating to data: "Are our hands becoming obsolete as creative tools? Are they being replaced by machines? And where does that leave the architectural creative process?"[2] An answer came precisely from the current new generation, reacting to the dull use of the digital trends of rendering and visualization, and arguing for a recovery of pre-digital "cut and paste" techniques, nevertheless with the use of digital tools. Sam Jacob contended this as a sign of a post-digital attitude driven by a similar modus operandi of the "so-called paper architects of the 1970s and '80s … At that time drawings were indivisible from the disciplinary conception of architecture. These were drawings not of architecture but as architecture."[3]

We can also compare this turn with the shift of the academical pencil hand drawing renderings of classical façades to the speculative collage works of the 1910s avant-garde. Precisely the repeatedly designed and emulated beaux-arts canon during the 19th century justified some of the early modern movement experiments and speculations. As Mario Carpo highlights in his recently published book *Beyond Digital*, these exchanges were broadly paralleled with three ways of making: "hand-making, mechanical machine-making and digital-making … that of the artisan, that of the factory, and that of computation."[4] Sequential in time, but without obliterating their predecessors, these three technologies are now becoming indistinctly overlapped and we can argue that it is from their creative balance that a critical position towards a sustainable environment could actually be construed. Thus, we can still have a designed goal towards the acuteness of the digital present, and the outcomes of artificial intelligence. More than questioning whether its future is unavoidable, it is urgent to research and unveil fertile exchanges between analogue and digital worlds, ultimately expressing a choice in each potential interchange.[5]

2 Michael Graves, "Architecture and the Lost Art of Drawing," *New York Times* (September 2, 2012): 5. Also available online: https://www.nytimes.com/2012/09/02/opinion/sunday/architecture-and-the-lost-art-of-drawing.html?_r=1&ref=general&src=me&utm_medium=website&utm_source=archdaily.com Graves shows his discontentment: "It has become fashionable in many architectural circles to declare the death of drawing. What has happened to our profession, and our art, to cause the supposed end of our most powerful means of conceptualizing and representing architecture? The computer, of course. With its tremendous ability to organize and present data, the computer is transforming every aspect of how architects work, from sketching their first impressions of an idea to creating complex construction documents for contractors. For centuries, the noun "digit" (from the Latin "digitus") has been defined as "finger," but now its adjectival form, "digital," relates to data."

3 See Sam Jacob, Architecture Enters the Age of Post-Digital Drawing, *Metropolis* (March 21, 2017), https://metropolismag.com/projects/architecture-enters-age-post-digital-drawing. Jacob refers to presentation drawings by Heerlijkheid Hoogvliet (2008), by Office Kersten Geers David Van Severen (2017), but also to the drawings in the master's thesis "Banhos do Tejo: espaços de água e de luz no Aterro da Boavista," by Maria Guerreiro Morais, with which Jacob opened his article. See Maria Guerreiro Morais, "Banhos do Tejo: espaços de água e de luz no Aterro da Boavista" (master's dissertation thesis, Faculdade de Arquitetura da Universidade de Lisboa).

4 Mario Carpo, *Beyond Digital: Design and Automation at the End of Modernity*, (Cambridge, Mass.: The MIT Press, 2023), 3.

5 As Carpo argues, "while the adoption, or rejection, of some new socio-technical models will ultimately be a political choice, the merger of computation and post-industrial automation is no longer a vision for our future: as the climate crisis and the pandemic have shown, this may as well be the only future we have." See Carpo, *Beyond Digital*, 160. At the end, Carpo concludes that actually "nobody knows what post-digital means." Carpo, *Beyond Digital*, 156.

For this choice, a more thorough knowledge of the links between the digital and non-digital phenomena has to be grasped, as Axel Karamercan tells us in the first article published in this issue. In his Heideggerian philosophical point of view, if in terms of our relation to the environment, digital and non-digital activities differ topologically concerning the notions of distance, such as nearness and remoteness, it is also true that a hierarchy cannot be established between both realms, "since there is not an immediate, primary access into the fixed reality of phenomena that provide a set of norms that by which the so-called secondary ones could be distinguished."

In fact, with the concept of "metaenvironment," Miguel Carvalhais underlines how these digital realms "potentially touch and include everyone." But, specifically, regarding design and the use of computational objects, he argues that "a poetic and creative level" is only achieved via "a dialectic process that requires all players to engage in it" and with "tools that are themselves developed as part of the design process itself." This brings an important critique to the shortcomings of an idea of pure automation. Indeed, the criticism on automation has been consistent from the early beginnings of computation. Supervised by Nicholas Negroponte – the leader of the Architecture Machine Group and pioneer of artificial intelligence research in architecture – in 1975 Anne Marie Fourcade interviewed some of the notable early authors in architectural computation and artificial intelligence, and concluded that "the constraint on the production of satisfactory computer aided design systems in architecture is not in the hardware or in the software but in the understanding problem."[6]

Besides the two already mentioned papers published here that respectively open and close a conceptual reading of this issue of JOELHO, the above quote is in tune with the other published articles, which in fact deal with very specific design problems – all in the context of recently finished research projects or which are still under development at different university research labs/centres in São Paulo, Porto, Pennsylvania, Campinas and Barcelona.

Hence, understanding the notions and challenges implied in a specific design tends to be even more crucial when the distance between the places of technological speculation and the contexts of actual application is greater. Indeed, Paulo Fonseca de Campos, Daniella Naomi Yamana and Daniel de Souza Gonçalves present a specific research that proves diverse levels are needed for a successful technological transfer and use of lightweight precast systems, built with digital means. It also shows how their research in the Fab-Lab at FAU–USP starts from previous experiments by João Filgueiras Lima in São Salvador da Bahia, and finds the right balance between laboratorial speculation and implementation. An applied research in outlying areas of São Paulo without any public infrastructures, urges them to "rethink the role of technology in the context of peripheral countries and understand how digital fabrication tools can assist social

6 See A. M. Fourcade, "Architecture and Automatized Methods: Criticisms on the Current Issues," Master in Architecture in Advanced Studies, (Massachusetts Institute of Technology, June 1975), 49. Fourcade interviewed Eric Teicholz, Guy Weinzapfel, Nicholas Negroponte, Aaron Fleisher, Cliff Stewart, Stanford Anderson, Alexander Tzonis, Mlike Gerzso and Timothy Johnson. The quote from Fleisher concerning the shortcomings of automation is poignant: "I cannot think of any device that would automatically change the world and absolutely guarantee a state of grace." See Fourcade, Architecture and Automatized Methods, 49.

processes in solving problems that are largely bound to the territory and the local scale."

Technology per se is thus permanently in need of continuous adaptation and optimization, particularly the challenges intrinsic to fabrication processes and tools. On the one hand, the lab research on robotic hot wire cutting by Pedro Martins and José Pedro Sousa questions how an indirect, subtractive, 3D cutting process can be consistent with "a more socially responsible and sustainable architectural practice" when building with concrete.

Nevertheless, an important message is left at the end, as they also contend that "what is not clear is how such technologies can be critically appropriated in architecture, balancing all these solicitations." On the other hand, for justifying an additive concrete construction technology, the specific features of place are considered key by José Pinto Duarte, Gonçalo Duarte, Nate Brown, Shadi Nazarian, Ali Memari, Sven G. Bilén, and Aleksandra Radlinska. 3D concrete printing is thus explored towards an expedited method for providing affordable housing for indigenous peoples in Nome, a remote permafrost region of Alaska.

Also, the territorial and local scales are witnessing a growing level of acuteness concerning specific, digitally driven methodologies. Marcela Noronha, Robson Canuto da Silva and Gabriela Celani implement city information modelling as a way to render the planning process more participatory from an early design stage. The modelling of the "International Hub for Sustainable Development" in Campinas is taken as the major case study. Participatory decision-making and place-making are balanced in the same process here. This entails one more step concerning an ongoing discussion, from the early 1960s models and their computational implications, on the scales of urban planning and territorial analysis.[7]

Finally, in the context of academic exercises undertaken at the Institute for Advanced Architecture of Catalonia (IAAC) in the framework of the Master in City & Technology (MaCT) – Internet of Cities Studio, Mathilde Marengo, Iacopo Neri and Eduardo Rico-Carranza tutored their students with the aim of testing a methodology in different places in Barcelona, Luxembourg and London that "exploits ecological connectivity, as expression of the implicit and planned tensions between these fragmented landscapes, in order to study, filter, and later validate design decisions."

Hence, we have come to the conclusion that most relevant idea in this issue of JOELHO is the multiplicity of disciplinary approaches that the digital culture has been witnessing in architecture, which depend foremost on "the understanding of the problem." Starting with a restricted group of technophile supporters of the 1990s cyberspace culture, digital environments are now ubiquitous, and also critical when assessing their broader outcomes, architecturally speaking but also socially and politically.[8]

7 We could recall the early efforts at the turn to the 1970s by Negroponte and Leon Groisser at the MIT Urban Systems Laboratory. Negroponte envisioned a kind of a "seeing machine": "... it is possible to build an architectural seeing machine by developing a simple device that will observe simple models. Such a mechanism is the prelude to machines that someday will wander about the city seeing the city. In such a manner, architecture machines could acquire information beyond that which they are given and therefore would have the potential to challenge and to question." Nicholas Negroponte, "Toward a theory of architecture machines," *Journal of Architectural Education*, vol. 23, no. 2 (March, 1969): 12.

8 For a critical review on the political autonomy of digital architecture, see Bruno Gil, "Digital Redux: the confluence of technologies and politics in architecture," *arq: Architectural Research Quarterly*, vol. 19, no.3 (2015): 259–268.

At the end, digital architecture has probably surpassed the prejudice of being an end in itself – to which it highly contributed – and is currently proving its infinite potentialities, at the same time as reckoning with the exponential developments of artificial intelligence. This brings new challenges and added responsibility regarding our response to the demands that the current moment poses to the discipline, a response which takes advantage of the full potential of the digital while maintaining a critical, constructive attitude.