

Architecture for More-than-Humans

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ABSTRACT

In his project New Babylon (1956–1974), artist Constant Nieuwenhuys proposes an alternative society that dedicates its time to creativity and play, and where human work becomes superfluous. Architectural paradigm of the free space and leisure enabled by the automation of work, New Babylon was also able to visualize the architecture of the post-labor world. A world that, fifty years later, is beginning to take concrete shape. Today, the architecture of full automation is being implemented in places like the Netherlands and China. Its introduction shakes the labor markets, as well as the configuration of human spaces and work tasks that have become obsolete with the emergence of machines in the production centers. These disruptive changes, however, could also be a trigger for the reinvention of the notion of human work and its architecture, from the perspective of its possible obsolescence. The architectural discipline faces the challenge of responding to the introduction of automation technologies. A research and

innovation domain that still lacks a critical spatial perspective, automated architecture is, however, fundamental to discern an imminent future and, ultimately, to explore our agency and capacity to accept or challenge it.

In his project New Babylon (1956–1974), artist Constant Nieuwenhuys imagined a new architectural paradigm enabled by the automation of work. In New Babylon, society dedicates its energy to creativity and play, and each individual designs her own environment. The inhabitants, liberated from the obligation to be useful, enjoy all their time. Here, the notion of 'free time' does not apply; all time is, in fact, play.

And yet, as Constant work evolves, his optimistic vision on the possibilities and pleasures of automated work gives way, gradually, to a more conflicting perspective. Violence would not be eradicated by the new technological order, mobilized to satisfy the immediate needs of society; rather, it would be revealed as an intrinsic part of its processes and objectives.

Constant's proposal for an alternative architecture and society where human work becomes superfluous – as points out architecture theoretician and historian Mark Wigley (2018a) – was able to visualize an imminent post-labor world. Over twenty years later, an architecture of full automation is no longer a utopian project, but a reality that is put to practice in different ways in places like the United States of America, Germany, the

Netherlands, Japan and China. These architectures have an impact on the built environment and the bodies that inhabit it and are manifest in new forms of cohabitation. They are not necessarily designed for human living or work, but for the maximization of production and circulation.

In these spaces, the architecture of the homo ludens (Johan Huizinga, 1949), in which Constant is inspired to develop the ideas that lead to New Babylon, is recreated and reinvented. Nevertheless, far from being the trigger of a new form of free and creative life, for many workers automation leads to a forced retirement. As Michel Foucault points out, although "men have dreamed of liberating machines, there are no machines of freedom, by definition" (Foucault & Rabinow, 1996, pp. 340–341). Machines are the quintessential human fantasy of the working body.

As autonomous machines maximize the performance of logistics infrastructures and industrial and agricultural production centers, as well as financial transactions, the presence of the human body and of the architecture designed around it becomes increasingly irrelevant. Certain human capabilities become dispensable and their spaces are rendered obsolete. Something that becomes manifest, beyond the boundaries of productive centers, in the gentrification projects for workers neighborhoods and in the subsequent displacement of its inhabitants. Also, in the bodies that, under relentless pressure and the influx of divisive climates, are

exhausted, stop, break down or become useless: they cease to work.

A trip through these architectures takes us to distant but interconnected geographies, to spaces that we believe we're familiar with, but to which we rarely have access to, or to those that have a banal appearance but are, notwithstanding, the epicenter of great transformations leading to new architectural paradigms, new notions about work and new interactions between humans and machines.

The Netherlands is one of the territories where full automation architecture is gaining greater relevance, with presence in very diverse areas, from their centers for agricultural and livestock production to the country's main port in Rotterdam. The cartesian landscape, designed for an unprecedented efficacy and productivity, is, without any doubt, an optimal testing ground for a possible post-labor world, which there seems imminent. The technology and architecture that make this possible have, in turn, an impact on the logic and on the relations that define the physical and social landscape of the country. The Netherlands is the raving image of the futures to come.

In the ocean of greenhouses that occupy and enclose ever larger areas of land, soil productivity is controlled and maximized through automated technologies. In these colorful interiors of sublime beauty, flowers and fruits grow assisted by systems for climate control and distribution of water and nutrients, with artificial lighting and without the restrictions imposed by the exterior conditions or the adjacent surroundings. Soon, too, without the restrictions imposed by human labor (Figure 1).

Meanwhile, in the centers for milk production, farmers direct the operations

through the screens of their tablets or computers, as well as from mobile applications. Cows are assisted by robots and their yield is managed from the cloud. In these centers, now designed as open flexible spaces, mammals and machines seem to coexist in a harmonious way. Here, the imaginaries of the sixties associated with the work of Cedric Price take shape. An architecture driven by technology that gives its user the control over the environment and adapts to the necessities and activities of its inhabitants. Or better still, a cybernetic meadow, where humans have been liberated from their work responsibilities and the walls have become obsolete⁽¹⁾ (Figure 2).

The APM container terminal in the port of Maasvlakte II in Rotterdam also includes cranes and autonomous vehicles as part of its logistic infrastructure. The introduction of this technology has yielded as result unprecedented levels of efficiency. Yet also protests and strikes of the harbor crane operators that fear for their workplaces (the work that before took some seven workers is now done by two or three employees). In January 2016, before the possibility that automation put at risk over 800 jobs, FNV Havens and CNV syndicates unanimously declared the strike; the first one in the harbor in over 13 years, it was backed by over 3,000 persons (Keane, 2016) (Figures 3 and 4).

The consequences of the introduction of robots are also visible outside the port, in real estate development projects destined to office workers that have replaced the old operators and that, from their seats in the control rooms, supervise the operations 24 hours a day, seven days a week. With their arrival, they transformed dramatically the socioeconomical character of the city; a

process, on the other hand, accelerated by different initiatives related to the future of the port.

Presently, Rotterdam is one of the main entry ports for cargo in Europe. From the city, goods are distributed to the interior of the continent. However, the arrival of the so-called Silk Route Railroad, promoted by China, is promising a radical revolution of the port, which will no longer be the gateway to Europe for goods transported from China. In this scenario, the Netherlands seek to position themselves as the managing and coordinating entity for the flow of goods (Jak, 2018). A position that inevitably demands the development of automated systems inside the supply chain. While Rotterdam is preparing for the transition from transport center to control center, the question remains, especially in relation to the debates on automation, who (or what) will be in charge of the operations.

If Rotterdam is crowned as transport and shortly as control center, on the other side we can find the so-called 'factory of the world', the Chinese region of the Pearl River delta. The delta is becoming one of the main scenarios for the transition to automated systems, with a growing number of state agencies and firms that advocate for the introduction of autonomous machines in the production lines. Since 2013, China has been the largest robot market in the world. Despite that the country is still lagging behind in respect to other countries – in 2016 it had an average of 68 industrial robots for every 10,000 workers, a low figure in comparison with the 631 that South Korea had and the 309 operating in Germany for the same number of workers –, the development and implementation of autonomous machines in the working place is increasing considerably, especially in the

Pearl River delta region (International Federation of Robotics, 2017).

In many cases, the total substitution of the labor force is not the main goal behind these measures. In a context of changing social dynamics and labor conditions (included the pressures to regulate workers' rights and the increase in the wages), the export-oriented production model based on an infinite supply of cheap labor force is being questioned (Huang & Sharif, 2017). Automation is seen as an alternative.

Foxconn, the largest electronic component manufacturer in the world, is at the forefront of these policies. In 2011, the firm announced a plan to equip its factories with a million robots. Replacing the simpler tasks performed by humans with automation technologies, according to Terry Gou, Foxconn CEO, would allow to reduce costs and improve efficiency (Branigan, 2011). Three years after Foxconn's announcement, the Chinese government launched Made in China 2025, a national plan destined to redirect the focus of its manufacturing industry from a paradigm of quantity – Industry 2.0, based on mass production using assembly lines –, to one of quality – Industry 3.0, organized around intelligent manufacturing. The plan foresees an increase in work productivity and competitiveness of its industry sector through the introduction of cutting-edge technologies like robotics and factory automation (Se, 2016).

Regional and local governments, especially those at the Pearl River delta, have also started their own automation programs with diverse social, political and economic backgrounds (Huang & Sharif, 2017). For instance, in 2015, the Guangdong province announced an initiative for the automation of the

production of automobiles, electrical appliances, electronic products, construction materials and clothing. In three years, the program has been endowed with 140 billion dollars plus subsidies that cover between ten and twenty percent of the update of industrial robotics for each firm. The name of the program is none other than 'Robots to replace human workers' (Dongguan City Government Office, 2014; Huang, 2017).

The new productive conditions have implications for architecture and, ultimately, for the bodies that inhabit it. Manufacturing and logistics infrastructure, as well as the automated supply chains in the Pearl River delta reveal possible architectural typologies for new notions of work and new forms of interaction between humans and robots. Such is the case with Build Your Dreams (BYD). In 2014, this firm, fifth world producer of batteries and supplier of electric vehicles that comprise Shenzhen public and private transport systems, opened an automated factory in Pinshan. Although the exterior structure of the building was not modified during the transition, the interior had to be redesigned to adapt to the new environmental and safety standards. Its architectural elements now outline the different relations between workers.

Glass walls separate humans and machines and, unless necessary, engineers and managers do not venture into the domain of the machines. In their place, software and computer systems monitor the processes through QR codes that track the state and location of the recently assembled batteries. As the number of human workers in the manufacturing processes decreases, assembly lines and storage areas reorganize to maximize productivity and

save space. In the robot world, spatial dimensions and safety conditions do not follow Neufert spatial dimensions and safety conditions. The work environment inside the factory, however, has become cleaner and more silent. Around it, the decrease in the number of humans employed in the production lines has led to the partial elimination and adaptation of the old workers' houses to accommodate more manufacturing space and, therefore, greater productive capacity. The company, in fact, plans to open an automated factory with double capacity in China's Northeast (Figure 5).

In the case of BYD, automation has been made possible and profitable due that the production of batteries includes monotonous and predictable operations (Jiang Shan, personal communication, January 25, 2018). However, the challenges of integrating automation are evident in the case of Foxconn factories. From the million robots they had planned to install, only 50,000 had been implemented three years later. According to Day Chia-Peng, general manager of Foxconn's automation technology development committee, besides the difficulty of replicating human coordination between hand and eye, any robotic solution had to be constantly adjusted according to the product cycles in order to avoid becoming obsolete (Huifeng, 2015).

Rapoo technology found a similar problem. In 2005, this manufacturer of electronic components based in Shenzhen resorted to automation as the solution to the shortage in labor force during high seasons. It took the company four years to automate one of its production lines. By then, the product for which the technology had been implemented was already outdated. As a result, Rapoo changed

its focus to increase the capacity to respond and introduced a new flexible manufacturing system, based on a model of collaborative production between humans and robots. Robots carry out tasks that are relatively simple and repetitive, which include a larger portion of standardized components, as well as dangerous and heavy tasks. Human workers, on their part, are in charge of duties that require more flexibility and are subject to changes in the market, being more complex to automate (Steven Lee, personal communication, October 25, 2017). This model, the company claims, allows to respond to future changes in the design of products and in the production line. However, although Rapoo shows that the obsolescence of machines can be even greater than the capacities of the human body, the number of its employees has fallen from some 3,000 to 700 after the incorporation of one hundred robots into its ranks. The workers' dorms, becoming increasingly empty, have also been reprogrammed (Figure 6).

In the factories, humans are not always replaced. On occasions they are reprogrammed. Automation plays a key role in the increase of efficiency and productivity through employee management. Such is the case with Ash Cloud, a company that produces accessories for mobile phones and tablets. At Ash Cloud, the Enterprise Resource Planning system (ERP), which can be accessed in real time through an IOS application from mobile devices, manages the factory internally and remotely. The ERP incorporates the size of the supply and demand, the stocks of products, resource usage, waste produced, work and vacation hours of employees, as well as figures related to currency exchange rates and stock market activity. The interfaces of

computers, tablets and mobile phones measure and visualize performance. Communication between the managing team and the employees is done through the application, making the image of the manager redundant. AI operates the workflow and maintenance of robots, takes over the management of human workers' tasks and shifts; manages their efficiency, trains them to carry out specific tasks and monitors their productivity against set goals. This real-time control of workers allows to adjust their movements to the manufacturing of components and satisfy the production needs with the least 'latency' and at the lower possible cost. Their performance is visualized with motivational formulas: a sad turtle or a happy rabbit head and evaluate each assembly line (Figure 7).

At Ash Cloud, robots and AI haven't replaced humans: they have become their managers. Human bodies, in turn, are trained to carry out tasks in a precise manner, over and over. Or, as architect and filmmaker Liam Young (2018) states, are optimized as components of a planetary-scale efficient production line. The promise of automation, in these examples, does not seem to lead to the society of leisure, but transforms humans into a sort of mechanical Turk. Before the implacable scrutiny of AI, employees experience an extraordinary pressure that can lead to reduce their resting time and their attention to issues of wellbeing and safety. Although the (still) humans that design and coordinate the supply chains do not visit regularly the production spaces nor the workers, but obsessively watch graphs and figures that appear in their screens, AI doesn't need them. Increasing levels of abstraction transform the bodies into numbers and eliminate all form of empathy and solidarity towards the worker. Technology, behind its processes

and soft, polished surfaces, hides the agents and structures that operate and control the bodies, those responsible for the innate violence against the cartesian landscape, designed for the exploitation of all the bodies (Figure 8).

As professor in digital humanities Miriam Posner proposes, perhaps management interfaces should incorporate tools that guarantee the workers' rights⁽²⁾. In fact, a great portion of the pro-automation programs does not include studies on the deep social transformations, the economic impact in the work market, or the ecological and climatic cost that these technologies bring about with them (Ernst, 2016). Although diverse measures have been proposed, among them educational programs to develop workers' abilities and skills, as well as a basic universal income and alternative tax systems, for many workers automation still seems like a synonym of a jobless future. It renders them replaceable, bodies with programmed obsolescence.

Yet, these disruptive changes may also be seen as a trigger for the reinvention of the notions of human body and architecture. As Wigley (2018c) proposes, machines are, in the end, the most prominent expression of our human condition; they store and facilitate our memories, as well as our ability to communicate, to understand our own body and that of the others. Their architecture, following this reasoning, the architecture for the machine, may perhaps be the ultimate manifestation of human creativity. And it would have to be the discipline, therefore, the one that should be reinvented. Something that Constant invited us to do in New Babylon.

In New Babylon, as Mark Wigley reminds us, the notion of architecture as profession does not apply. Already

liberated from the obligation of being useful, all inhabitants have become their own architects in charge of designing their environments (2018a). The world beyond work, the post-labor world that in New Babylon is materialized in the planet-sized hyper-flexible scenario, is continuously remodeled by the flow of desires of all those who inhabit it; an infinitely malleable world of environments without doors, walls, windows, rooms, furniture or accessories; a vast scaffolding that supports a labyrinth of thin floating planes (Wigley, 2018b). In Wigley's words, Constant imagined "the end of the architect and architecture as we know it" (2018a, p. 78).


Today, this architectural scaffolding supports the software, applications, interfaces and technologies of automation that shake not only work markets, but also the foundations of the architectural discipline. It is about a type of space that is not generally present in architectural discourse and does not represent an area of priority for offices nor schools or universities. And, however, they are the environments in which the new paradigms of work are being designed and, for this reason, the way in which our society will be organized in the future.

The systems that make possible this reality based on efficiency and production, on the other hand, are based on the exploitation and invisibility of its labor force; Liberty, as New Babylon teaches us – like factories, farms and contemporary ports –, is built at the expense of control and the work of 'others', in this case, bodies (human and non-human) conceived as robots. The architectural discipline not only lacks the preparation to take an active role in the technological transformations that come, but its practice satisfies,

ultimately, the forces and ethics that instigate them. Our way of designing is obsolete. Cities and buildings are, for the most part, organized around obsolete ideas of coexistence. The architectural discipline still places man at its center, is based on systems of exploitation and use of bodies at different scales – from human to planetary –, as well as in the depletion of resources, and follows the dictates of the market and the rationality of economic efficacy, instead of ethical and ecological awareness.

The architectural community, therefore, is currently facing the challenge of responding to the obsolescence in the discipline that Constant had foreseen. Still lacking a critical spatial perspective, the domain of investigation and innovation in automation is key to discern this imminent future, and ultimately, to explore our agency and capacity of accepting or challenging it. In the end, the fascination and anxiety that an automated world produces can be used to trigger a change in paradigm, something that a large portion of the architectural community has not fostered even before the prospect of social, economic, or ecological debacle. A change that, perhaps, could be implemented through the convergence and alliances with de-colonial, post-anthropocentric and queer epistemologies, given that these have imagined and instigated more equitable and inclusive social, political, technical and biological ecologies.

New Babylon invites its inhabitants to transcend their own limits and to constantly redesign themselves. The drive of creativity is its engine. And creativity is, by definition, the transgression of the existing reality. The incipient obsolescence of architecture could be a starting point generative of forms of creativity, imaginaries, epistemologies

and spatial relations; an opportunity to catalyze a change towards new structures and relations; towards systems of cohabitation, sensibility and care of collective more-than-human bodies. 

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NOTES

- (1) Reference to Richard Brautigan's poem 'All Watched Over by Machines of Loving Grace'.
 (2) See: <http://miriamposner.com/blog/>

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