

Two Stances on Water: Political Ecology in Techno-scientific Art from Mexico

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Water is one of the most recognizable areas of impact of climate change. Warming global temperatures affect natural water cycles by causing, among other things, more precipitation in the form of rain, as opposed to snow, as well as earlier ice melting during winter months.¹ In recent years, there has also been an increase in extreme weather events related to water, from floods and tsunamis to droughts in both coastal and continental areas. However, human-caused climate change has not been the only factor in the current global crisis of water. Industrial pollutants and unjust policies over water management and distribution have resulted in large sections of the population, particularly in developing nations, to have decreased access to clean and sustainable sources of water for agriculture, hygiene, and personal consumption despite the recent recognition of water as an inalienable human right.²

Against this global backdrop, Mexico faces its own water crisis, particularly in the Valley of Mexico, where Mexico City is located. Built in the basin of a large lake over 7,000 feet above sea level, the city sources around forty percent of its water from remote locations through an 8,000-mile network of pipes. Due to its high altitude, an intricate system of pumps—requiring massive infrastructure and continuous maintenance—is needed to bring water into the city.³ With a population of over twenty million, water supply suffers from significant shortages across the city. Access inequality adds to the crisis, as a large portion of its population, mostly concentrated in the adjacent neighborhood of Iztapalapa (where nearly two million people live) do not have access to water from their taps and have to resort to costly door-to-door water deliveries.⁴ Mexico city's water crisis, which is expected to worsen in following years, is not a recent phenomenon, but the result of a long and evolving process that includes the desiccation of its natural bodies of water, inefficient urban planning throughout the colonial era and the nineteenth century, as well as corrupt environmental policies that allowed the pollution of its major sources of water, such as the Lerma River.⁵ A deep understanding of this multilayered issue, which involves not only environmental, but also political and economic factors, is needed to address its challenges in a more efficient and sustainable way.

Through the lens of political ecology as an approach to unmask the externalities of environmental action—understood as the disowned political, social, and Western capitalist offshoots of the ecological discourse—I analyze two recent techno-scientific artworks that frame the issue of water beyond being purely environmental and more as pertaining to the realm of modern infrastructure and the post-anthropocentric turn. A continuation of his previous work in search of autonomous bio-mechanical

creatures that interact with their environment, *Plantas Autofotosintéticas* [*Autophotosynthetic Plants*] (2015) by Gilberto Esparza (b.1975) questions the human primacy over natural resources by presenting fictional scenarios in which hybrid bio-machines exist and live off the waste and technological products of humanity. On the other hand, *Possessing Nature* (2015) by Tania Candiani (b.1974) and Luis Felipe Ortega (b.1966), presented at the 2015 Venice Biennial, offers a critique of the politics of modern infrastructure over the management and distribution of water resources, as well as a broader exposure of the geopolitical dynamics between center and periphery.

In the following section, and before delving into these works, I will provide a brief discussion on the ideas of political ecology, as well as the potential of techno-scientific artistic practices to offer critical positions from which to address these issues. Following art historian T.J. Demos, I attempt to elaborate on a more robust notion of ecology by considering its social, political, economic, and technological aspects. I then argue that artists working at the intersection of art, technology, and science can offer a unique approach to political and environmental issues through the new expressive possibilities brought about by technological experimentation.

Environment, Power, and Knowledge: Political Ecology and Techno-scientific Art

Artists have been interested in ecological and environmental issues for decades. Some authors even trace the precedents of ecological art to nineteenth-century landscape painting.⁶ Since the 1960s, however, contemporary artists have engaged in more direct ways to address these issues through a range of actions including performances, demonstrations, revitalization and urban development projects, and environmental activism. For example, in the early 1970s, artist Joseph Beuys was involved in multiple environmental actions, from leading public demonstrations to save a forest near Düsseldorf, Germany, to his 1971 *Bog Action* performance aimed at protecting threatened wetlands along the Zuiderzee bay in the Netherlands.

Despite the increasing attention that environmental issues have gained since the 1970s, primarily because of the evident reality of climate change, terms like "ecology" and "sustainability" are often misused or misrepresented. In a broader sense, ecology refers to the idea that organisms are interdependent on each other and their environments; this interdependence can be seen from the relationship of cells to a body to multicellular organisms and their habitat.⁷ For this reason, the term "ecology" has also been used to refer to the social, political, and even technological environments that humans inhabit today, as in the term "media ecology," which is associated with cultural theorists such as Harold Innis, Neil Postman, and Marshall McLuhan. As T.J. Demos observes, an analytical approach is needed to see "ecological discourse as a system of representations forged at the intersection of power and knowledge."⁸

In relationship to ecological art, Demos identifies two important shifts in artistic practices since the 1960s. Early ecological art, such as Alan Sonstis's *Time Landscape of New York City*, proposed in 1965 and realized in 1978, can be seen as *restorationist eco-aesthetics* or art that "attempts to repair damaged habitats or to revive degraded ecosystems."⁹ These works focused on the beautification of the land, often overlooking the economic or political forces at stake. From 1970 through the 1980s, due to the development of cybernetics and systems theory, artists began to create environmental projects that linked different ecologies into works that constructed "an 'environment' that can no longer be considered simply as 'natural,' and where any 'output,' according to the operations of cybernetic feedback, was simultaneously understood to affect the working of the system."¹⁰ Hans Haacke's *Krefeld Sewage Triptych* (1972), for instance, provided information on the levels of pollution of the sewage system in Krefeld, Germany, and included the names of its major contributors, exposing the city's responsibility in creating the problem. The nature of these works, however, was more confrontational and often artists did not engage directly in environmental activism.

Systems ecology, as Demos notes, paved the way for a more active and engaged "political ecology," which reflected a more comprehensive understanding of environmental matters, as intrinsically related to social, political, and capitalist forces.¹¹ Artists engaged in political ecology synthesize the activism of early ecological artists with the political outlook of systems ecology. These artists reflect on their own practices by incorporating playfulness, irony, and self-referentiality into their projects. Projects like Tue Greenfort's *Diffuse Einträge* (2007), which used a liquid manure truck to shoot jets of water into the Aasee [Lake Aa] in Münster, Germany, "indicate a deep skepticism about the motivations, aims and results of pragmatic environmental art."¹²

Digital technologies, on the other hand, due to their potential to build modular, participative, and interactive networks, provide artists with new expressive tools to address diverse issues faced by society today. For this reason, theorists like Oliver Grau have dubbed media art, "the art of our time," as it problematizes contemporary societal challenges ranging from genetic engineering and the rise of post-human discourses, to the processes of globalization and surveillance.¹³ Although often characterized as "value-free or inherently liberatory," media and digital technologies function also as fields that facilitate critical discourses like post-colonialism and feminism.¹⁴ For instance, through an analysis of Rafael Lozano-Hemmer's 1997 interactive work *Displaced Emperors*, presented in Linz, Austria, María Fernández addresses the colonial connection between the Austrian empire and Mexico during the nineteenth century and elaborates on a post-colonial discourse of physiological specificity and the subjectivity inscribed on the post-colonial body. Fernández questions the "post-human" discourse of technology, which implies the obsolescence of the body, and highlights its ludic experience.¹⁵

Freed from industrial and commercial interests, and for the most part, under-represented by the art market, media arts articulate a genuine interest in high and low technology with a critical gaze on the impact of technologies in society. The unique perspective of media arts lies in its theatrical and process-based approach to phenomena, displacing representation or evocation in favor of the staging of functional systems that often require audience activation. Lozano-Hemmer's *Displaced Emperors*, for instance, allowed users to control a large hand projected onto the façade of a Habsburg castle in Linz. Users could then use the hand to *caress* the building and *reveal* its interior, triggering a series of projections with images from the actual interior of the castle, as well as interiors of the Chapultepec castle in Mexico City, which served as the Habsburg residence during the short reign (1863–1867) of Maximilian I of Mexico.

Many artists working with technology today also engage in scientific research, actively collaborating with scientists, researchers, engineers, and technologists. Those at the intersection of art and techno-science represent a special "breed of artists," as they "stand with feet in both worlds," working optimistically on the development of new technologies and networks, while standing back to critically approach the very systems with which they engage.¹⁶ These artists, as observed by Stephen Wilson, learn the language and particularities of techno-scientific research to function as "knowledgeable commentators."¹⁷ One such artist is Gilberto Esparza, whose artistic practice is driven by research interests relating to issues of the environment, the agency of machines, and the efficiency of current technologies. In the following section, I elaborate on Esparza's work and its particular stance towards the problem of urban wastewater and post-anthropocentrism.

Plantas Autofotosintéticas: Post-anthropocentric Bio-machine Hybrids

In 2015, Mexican artist Gilberto Esparza received the Golden Nica award in the category of Hybrid Art at the Prix Ars Electronica in Linz, Austria, for his installation *Plantas Autofotosintéticas* [*Autophotosynthetic Plants*], a self-regulating symbiotic system consisting of tubular arrangements of microbial fuel cells (MFCs) that clean wastewater and produce electricity (Figure 1). A set of eight to eleven columns, containing modular MFCs, sustain a "nucleus" placed in the center of the installation, which houses an ecosystem of protozoa, algae, plants, and other microorganisms (Figure 2). The columns are fed with wastewater from sewage sources that passes through the MFCs. Metabolic processes in bacteria (from the genus *Geobacter*) clean the water and release electrons, which are then harvested by the system. The clean water is then channeled directly into the nucleus while generated electricity is transformed into bursts of light that are used by the plants to complete their photosynthetic processes in the darkness of the gallery. A monitoring panel completes the installation by displaying real-time data on the performance of the system as a whole.



Figure 1. Gilberto Esparza, *Plantas Autofotosintéticas* (2015), installation view during the Ars Electronica Festival 2015, Linz, Austria. (Image courtesy of the artist)



Figure 2. Gilberto Esparza, *Plantas Autofotosintéticas* (2015), detail of nucleus. (Image courtesy of Mariana Pérez Bobadilla)

By staging an interdependent relationship between plants, microorganisms, and human-made technological components, *Plantas Autofotosintéticas* raises questions, not only about the state of water pollution, but also the anthropocentric approach in which these issues are commonly framed. In spite of the optimistic position taken by the artist in his description of the work as a “model of a self-regenerative water system which could be applied to cities,” *Plantas Autofotosintéticas*, in fact, could not and is not intended to be applied as an effective system to counteract water pollution. The artifact is self-contained; the cleaned water resulting from the MFCs cannot be extracted by humans and the electricity generated by the billions of bacteria is barely sufficient to power the system itself. The work is post-human in a more literal sense—it gets away without humans.

I believe *Plantas Autofotosintéticas* is better understood within the context of Esparza's own artistic research and previous work involving MFCs and semi-autonomous machines, particularly in relationship to his project *Plantas Nómadas* [*Nomadic Plants*] (2008-2013). *Plantas Nómadas* consists of a hybrid robotic organism, which is capable of cleaning water from polluted rivers through the use of MFCs embedded within its structure. As opposed to the stationary nature of *Plantas Autofotosintéticas*, requiring the whole space of the gallery, *Plantas Nómadas* is intended to be a mobile machine that autonomously wanders around bodies of polluted water to *stay alive*. Like *Plantas Autofotosintéticas*, the hybrid robot uses electricity generated by the fuel cells to power itself and *cares* for plants on its back that grow using the water cleaned by the organism. Esparza tested *Plantas Nómadas* primarily on the Lerma River, Mexico's second longest river, which serves as one of the main sources of electricity and water for Mexico City. The Lerma, however, is highly polluted, as samples from the river have been found to contain, among other pollutants, heavy metals such as cadmium, chromium, iron, nickel, mercury, lead, copper, and zinc, some of which are known to cause serious health problems like cancer and brain damage.¹⁸

In his recent book, *Decolonizing Nature*, T.J. Demos devotes an entire chapter surveying artistic practices in Mexico that have addressed multiple ecological and environmental issues since the 1990s. Demos makes references to Mexican and international artists such as Helen Escobedo, Minerva Cuevas, Marcela Armas, Gilberto Esparza, the Danish collective Superflex, Pedro Reyes, and Maria Thereza Alves. In contrast to artists like Cuevas, Escobedo, or Armas, whose confrontational works try to bring waste and pollution into “our field of vision,” Demos recognizes artists like Esparza and Superflex as moving beyond representation into an attempt to redirect the “repressed, unaccounted, and disavowed toward positive ends.”¹⁹ In reference to Esparza's *Plantas Nómadas*, although acknowledging that such projects cannot be taken as permanent solutions, Demos concludes that “these models, given their small scale and isolated occurrences, acknowledge the limited effectiveness of their techno-fixes, yet still try to operate within the world and ameliorate its dysfunctional conditions.”²⁰

In general, Demos's analysis focuses on the conceptual drive of these practices and the ecological and political issues to which they draw attention; however, what he seems to overlook is the post-anthropocentrism of Esparza's work. By grouping together such a diverse range of works, from Cuevas's *Del Monte* (2003) to Superflex's *Supergas* (2014), the use of biotechnology and hybrid systems in *Plantas Nómadas*, in Demos's account, becomes secondary. I argue, instead, that an understanding of the techno-scientific postulates in the work of Esparza, spanning from *Plantas Nómadas* to *Plantas Autofotosintéticas*, or more recently, in his project *BioSoNot* (started in 2013), will generate a very different reading of this type of work in the context of environmental art activism and political ecology.

Like art historian Mariana Pérez Bobadilla, I believe that the use of microorganisms, as both discursive theme and power source for the works, is crucial. MFCs—microbial fuel cells—transform chemical energy from organic compounds contained in the water into electrical energy via a metabolic process of oxidizing organic matter.²¹ Bacteria simplify organic compounds and, in the process, release electrons through the electron transport chain (ETC) of their membrane. In order to harvest these electrons, an anode within the MFC and a cathode in contact with oxygen are needed to cause the electricity to flow.²² As electrons are generated from organic bacterial activity, the hybridity between chemical and biological processes in MFCs exists in a very fundamental level. Thus, the use of MFCs as artistic medium poses critical questions regarding the distinction between living and non-living matter, as well as issues of microbial agency and post-anthropocentric hybrids.

When discussing works like *Plantas Nómadas*, Demos asks whether they "merely reproduce green-capitalist ventures, as prototypes for mass-reproduced commodities? Or are they an urgently needed conceptual model of energy sovereignty?"²³ They are neither. Although the chemical and organic principles needed to build MFCs has been known since the 1930s, when researcher Branet Cohen created the first fuel cells, these hybrid technologies are not yet fully developed enough in order to produce larger amounts of electricity.²⁴ Working with leading researchers in the field, such as Dr. Carlos Godínez from the Universidad Politécnica de Cartagena, Spain, Esparza's work reflects the state of research: *Plantas Autofotosintéticas* requires a massive amount of MFCs, and physical space, to sustain a small enclosed environment. Meanwhile, *Plantas Nómadas* produces so little electric energy that it mostly remains dormant, in addition to the already mentioned issue that the cleaned water cannot be retrieved from these creatures. In this sense, and in contrast to more practical artistic approaches such as Newton and Helen Harrison's *Atempause für den Save Fluss* [*Breathing Space for the Sava River*] (1989) or Patricia Johanson's revitalization of the Leonhardt Lagoon in Dallas, Texas (1981-1986), Esparza's works function more like fictions than prototypes. They cannot be read as "prototypes for mass-reproduced commodities" because they work by and for themselves; they do not provide anything for humanity and it will be costly to mass-produce them. But

they also cannot be seen as "urgently needed models" for the same reasons. Instead, these projects are a form of scientific speculation, or material fiction, that question the primacy of the human over natural resources and, at the same time, display non-human forms of bio-mechanical hybridization.²⁵

Both *Autofotosintéticas* and *Nómadas* use and display functioning technology that can be otherwise implemented to counteract water pollution and improve human access to clean water. Nevertheless, these projects emphasize the "organismic" nature of their fictionalized characters—the hybrid robot and the autonomous system. In this context, it is also worth mentioning another project by Esparza, *Parásitos Urbanos* [*Urban Parasites*], started in 2006, which consists of a series of simple technological parasitic organisms that inhabit urban space and steal electricity from the city's public infrastructure. Like the projects discussed above, *Parásitos Urbanos* centers on the autonomy of fictional beings that live off the products and waste of modern society. These works by Esparza are not technological "systems", like Haacke's works in the 1970s, which problematize issues related to water and energy sources by exposing the different agents involved in the problem; rather, they are catalogs of fictionalized techno-creatures that, as curator Karla Jasso points out, relate more to the tradition of Natural History than to the circuit of contemporary art.²⁶

While the work of Esparza focuses on the creation of functioning automata and the possibility of *collaboration* between technological components and microorganisms, the next work underlines the deeper premises of modern thought, as they make implicit a requirement to subdue and control nature in favor of industrial progress.

Possessing Nature: The Politics of Infrastructure and False Modernity

Despite the celebrated Mexican pavilion at the 1950 Venice Biennial, which featured works by "the big three"—José Clemente Orozco, Diego Rivera, and David Alfaro Siqueiros—and Rufino Tamayo, the participation of Mexico at *la Biennale* became irregular and sporadic for the rest of the twentieth century.²⁷ Only since 2007 has Mexico consistently participated with a national pavilion in Venice, with the works of Rafael Lozano-Hemmer (2007), Teresa Margolles (2009), Melanie Smith (2011), Ariel Guzik (2013), Tania Candiani and Luis Felipe Ortega (2015), and Carlos Amorales (2017). Of the six contemporary pavilions, three have featured projects of art and technology, namely, the pavilions of 2007, 2013, and 2015. From 2007 to 2013, the exhibitions were hosted at various locations across the city; however, in 2015, the Mexican pavilion, which featured the collaborative installation of Candiani and Ortega, *Possessing Nature*, was granted a new fixed location at the Arsenale di Venezia, one of the two main venues of the event along with the Giardini. The journey of the Mexican pavilion since 2007 became a central theme in *Possessing Nature*, as the installation presented a memory of the nomadic presence of Mexico at the event, marking its trajectory from periphery to centrality, while also posing critical

questions concerning issues related to technology, cosmopolitanism, urbanism, and the idea of modernity in general.

Possessing Nature articulates multiple forces and sources of reflection. One of these forces emerged from the mapping of a physical trajectory that connected the four locations that previously hosted the Mexican pavilion since 2007—the Palazzo Soranzo van Axel, the Palazzo Rota Ivancich, the Chiesa di San Lorenzo (San Lorenzo church), and the Venetian Arsenal. The resulting outline then served as the basic shape of a monumental sculpture consisting of numerous large-scale metallic panels forming a canal in between to allow the flow of water (Figure 3). Water was drawn directly from the Venetian lagoon, passed through the canal, and eventually, released back into the lagoon in a continuous loop. A platform installed by the south wall of the gallery space allowed visitors to view the canal from above, giving a glimpse of the flow of water; however, the source of the water and its release were hidden from the audience's direct sight (Figure 4). Aside from temporarily containing the water, the sculpture did not modify or affect the water in any way, rendering a contradictory use of technological and spatial resources. As artist Tania Candiani shared with me, *Possessing Nature* is a work of "useless engineering."²⁸

Through the actual use of lagoon water and the presentation of a functioning, yet pointless, hydraulic mechanism, *Possessing Nature* aimed to present a subtle but poignant criticism of modernity as a project that assumed the colonization and exploitation of natural resources as the inevitable consequence of progress. Based on the idea that both Mexico City and Venice were founded on water, at first sight, the work seems to underscore a celebratory parallelism between the two cities. Handouts in the exhibition space at the Arsenale offered a side-by-side reproduction of a map of Venice and a sixteenth-century map of Tenochtitlan, the former Aztec capital and current-day Mexico City; this pamphlet highlights the similarities of the two cities, which are depicted seemingly *floating* over a body of water. Additionally, a running video projected onto a pool of water at the end of the sculpture, mostly the work of Ortega, also showed overlapping images of the Venetian canals and Mexico City's water management network (Figure 3).



Figure 3. (top) Model for *Possessing Nature*. (Image courtesy of Karla Jasso). (bottom) Tania Candiani and Luis Felipe Ortega, *Possessing Nature* (2015), installation view at the 56th Venice Biennial. (Image courtesy of Tania Candiani)

Mexico City sits in a large basin on a high plateau in central Mexico—approximately 7,200 feet above sea level—and is surrounded by a range of mountains and volcanos. The topography of the Valley of Mexico, also known as the Basin of Mexico [*cuenca de México*], facilitates the natural formation of rivers, creeks, and springs, as well as high volume precipitation between April and October. Approximately fifty rivers, originating in the surrounding mountains and other remnants of the ancient lakes, flow into the city, which became sources of fresh water and navigable canals for centuries. After the fall of the Aztec capital in the early sixteenth century, Texcoco Lake—a

network of connected lakes including the lakes San Cristóbal, Zumpango, Xaltocan, Xochimilco, and Chalco—began to be drained to accommodate the development of the newly established colonial capital. The hydraulic changes initiated by the Spanish settlers gave rise to a multitude of issues ranging from water scarcity to floods. Most notably, the city suffered from severe flooding in the sixteenth and seventeenth centuries, with the years 1586, 1604, 1629, and 1634 as the most extreme.²⁹

Although Mexico City and Venice might share a similar origin, they did not share the same history. Unlike the canals in Venice, the rivers in the Basin of Mexico were almost entirely piped and transformed into Mexico City's main avenues and sewage network. In the nineteenth century, the network of rivers was already used as open sewage; however, in the twentieth century, after the Mexican revolution, multiple efforts to modernize the city resulted in policies that favored the construction of roads and effectively changed the hydro-ecological landscape of the city. In 1938, architect Carlos Contreras proposed the construction of roads and avenues over the rivers La Piedad, Consulado, and Verónica, and by 1964, eighty kilometers of rivers (about 50 miles)—corresponding to the rivers Churubusco, Magdalena, San Ángel, Tequilazco, Barranca del Muerto, La Piedad, Becerra, Tacubaya, Consulado, San Joaquín, and Miramontes—were piped and transformed into avenues and roads.³⁰ When discussing the process of transformation of Mexico City's original rivers and canals into roads and avenues, Mexican architect and urbanist Jorge Legorreta noted that, "we were guided, and are still guided, by a false modernity based on destroying any vestige of nature that opposed to the prevalence of the automobile."³¹

Possessing Nature also mourned the loss of Mexico City's river network, which some of its current inhabitants still recall today. In addition to the sculptural component of the work, the artists invited composer Gabriela Ortiz—known for her acclaimed 2008 opera *Únicamente la verdad*—to write a piece, in the form of an operatic recitative, naming the various rivers and canals that no longer exist in the city. The piece, titled *To Invoke Buried Rivers*, was performed daily during the opening week of the Biennale by baritone Óscar Velázquez, who sang lying face up on a typical Venetian gondola (Figure 4) as it toured through the canals in San Polo and Dorsoduro—both neighborhoods with less touristic traffic. The performance's daily schedule and route were not publicized, as the artists did not want to draw touristic attention to it; instead, the inhabitants of Venice, and the city itself, became the audience. For the duration of the performance, the score written by Ortiz was transformed into a sort of lament, which appeared to roam through the narrow streets and canals of Venice with no clear source or direction, as the gondola and the singer were difficult to see.



Figure 4. (top) Tania Candiani and Luis Felipe Ortega, *Possessing Nature* (2015), top view. (Image courtesy of Tania Candiani). (bottom) Baritone Óscar Velázquez performing Gabriela Ortiz's *To Invoke Buried Rivers* (2015), Venice, May 2015. (Photograph by author)

Through this gesture, Mexico City's canal system was longed for and reinterpreted through the lens of the Venetian layout, a possible urban picture that the Mexican capital never achieved. But, beyond the picturesque analogy of Venice to the loss of Mexico City's waterscape, the need for a "rescue mission" over this natural system of rivers and canals has gathered attention in recent years as the city faces a severe water crisis. As pointed out by Legorreta, there are various reasons that call for urgent action to restore the natural network of rivers that fed the Basin of Mexico, including the prevention of future floods, improvement of water distribution and reduction of scarcity, prevention of subsequent subsidence of the land, reduction of health risks and spread of disease, and the creation of public spaces and real estate value.³²

The infrastructure around water is used in *Possessing Nature* as a frame to critique the promises and premises of modernity. In contrast to Gilberto Esparza's work, which resorts to technology in order to stage a functioning system that cleans water from polluted rivers, *Possessing Nature* offers a "(counter)infrastructure," as Jasso's curatorial text expresses, a work that silences the instrumentality of engineering and renders machinery absurd. A water filtering system embedded within the sculpture appears to be missing from the work. In 2011, for the Turkish national pavilion at the 54th Venice Biennale, artist Ayşe Erkmen created the installation *Plan B*, a hydraulic system that took water from the canals and purified it to make it drinkable for visitors. Unlike Erkmen, however, the Mexican artists consciously avoided taking their work in this direction. As Ortega explained to me, *Possessing Nature* is not about water, but about the politics of water.³³ In fact, following its confrontational title—which Jasso has expressed to be indebted to science historian Paul Findlen—water proved to be *unpossible*, as the sculpture suffered from constant leaking, corrosive damage, and even inadvertently hosted the growth of small algae and fungi.

Finally, there is another level in which the work framed its political and ecological critique of modernity, namely, the relationship between center and periphery. The Mexican pavilion in Venice has been a critical stage in which artists have expressed, through local issues, a broader discontent with the ideals of modernity and globalization. For example, in 2009, in her provocative installation, *¿De qué otra cosa podríamos hablar? [What Else Could We Talk About?]* Teresa Margolles addressed the rise of violence in Mexico due to the war on drugs. José Luis Barrios, who curated the Mexican pavilion in 2011, observes that there is a shared preoccupation between all the post-2007 pavilions that "evidences the complexity and deepness with which the artists have problematized their relationship, not only with art, but with the conflicts inherent to globalization."³⁴ It is precisely Venice where the modern idea of "enterprise" was articulated, as the city experienced a flourishing of mercantilism and trade during the sixteenth and seventeenth centuries. This articulation of commercial interests, trade, and political autonomy was facilitated by Venice's geopolitical position and control over maritime routes. As Barrios notes, "this city-port in the geography of the old continent produced [...] the cartography of progress."³⁵

In the light of geopolitics and the relationship between center and periphery, the apparent parallelism between Venice and Mexico City depicted in *Possessing Nature* begins to crumble. The trace-memory, used as the blueprint to give shape to the sculpture—the trajectory towards centrality—becomes then a "trace-wound" (*traza-herida*), according to Barrios.³⁶ If Venice represents the symbolic departing point of the modern enterprise, then Mexico/Tenochtitlan represents its destination, the culmination of the trip, where the ideal to possess the other—the urgency to attract the other to the center—is crystallized.

Two Stances on Water: Conclusion

In the catalog to the 2015 exhibition *Cultivos* at the Laboratorio Arte Alameda in Mexico City, Gilberto Esparza included a series of visual works in the form of a fictional comic strip that narrates the adventures of his *Plantas Nómadas* machine. In the story, after entirely restoring the Lerma River to its original condition, the robotic organism, having depleted all its energy and resources, *dies* while a tree begins growing through its structure, immortalizing the creature for "a thousand years."³⁷ This story evidences the seemingly contradictory character of Esparza's work. In the fictional world of this bio-mechanical creature, the restoration of the river's water represents its downfall. Clearly, Esparza is concerned with the state of pollution of natural resources; however, he chooses a strategy that places non-human agents and post-anthropocentric figurations in the center of the issue, questioning the priority of humans and their right over natural resources. His stance on the issue of water pollution, and its possible solutions, are not necessarily absent from the work. As mentioned before, Esparza's artistic research puts forward the development of alternative technologies that might eventually be implemented in larger scale in the future. However, his position necessarily problematizes the role of humans in the issue and, perhaps, is even skeptical of humanity's ability to address it in an efficient and sustainable way.

On the other hand, *Possessing Nature* by Candiani and Ortega brings to the global stage a local issue with which many communities can identify. It attempts to speak about the ideas of infrastructure relating to water by modelling that same infrastructure. As a work of "useless engineering," the absurdity of this machine points to the empty promises of modernity and presses into the wounded soil of Mexico City, now bereft of its natural system of rivers and canals and currently facing a severe water crisis. The work also presents a critique of the relationship between the center and the other. For curator Cuauhtémoc Medina, the *contemporariness* of contemporary art is articulated through the "center-periphery arrangement around the enclave of the North Atlantic."³⁸ As such, for Medina, contemporary art is necessarily "NATO art."³⁹ It is within this geopolitical context that *Possessing Nature* frames its position on the premise of control and domination of the waters.

The artworks discussed here are not openly confrontational. For instance, in comparison to previous pavilions, such as Margolles's 2009 exhibition, *Possessing Nature* lacked a more transparent and direct position towards the issue it intended to address. It can be argued that given the specificity of the history of modernization and water infrastructure in Mexico, the work failed to offer a more compelling presentation of the critical statements it aimed to put forward. Nonetheless, the physical use of water from the lagoon, and the massive work of engineering that the installation displayed, confronted audiences in a very visceral manner, not unlike Margolles's work. From the exhibition, I recall the blaring sound of the water being constantly pumped through the sculpture, as well as the piercing stench of the putrid water that stagnated in the corners of the canal. Similarly, in Esparza's *Plantas Autofotosintéticas*, the physical encounter with technology, the awareness of its mechanisms and its seeming autonomy, makes the work staggering.

Beyond the aesthetic reaction that these works provoke, they open up a set of critical reflections on multiple ecologies, from natural environments to the politics and economics around these environments and their natural resources. Unlike other artistic practices addressing ecology, they do not propose solutions or models to be implemented in the practice; instead, they articulate different positions that problematize ecological discourse and expand the very notion of ecology.

Born in Mexico City, RODRIGO GUZMAN SERRANO is an art historian researching the interaction between art, science, and technology. He is interested in the use of new technologies both as a medium for artistic expression and as a tool in the study of art. He studied Art History at the City College of New York, and he recently finalized his masters degree in Media Arts Cultures at the Danube University in Krems, Austria. He was worked for different institutions devoted to art and research both in the United States and in Europe, such as the New York Art Resources Consortium (NYARC) and the Archive of Digital Art (ADA). He has presented his research in conferences and symposia such as the International Symposium on Electronic Art (ISEA) in 2012 in Albuquerque, NM, and the Electronic Visualization & the Arts (EVA) conference in 2018 in Copenhagen, Denmark.

NOTES

¹ US Environmental Protection Agency (EPA), "Climate Impacts on Water Resources," captured January 19, 2017, accessed February 2018, https://19january2017snapshot.epa.gov/climate-impacts/climate-impacts-water-resources_.html. Note that since January 2017, the EPA website has deleted its contents related to climate change in accordance to the environmental agenda of president Donald Trump and EPA administrator Scott Pruitt.

² In 2010, the United Nations General Assembly issued a resolution (No. A/RES/64/292) addressing the human right to water and sanitation.

³ Michael Kimmelman, "Mexico City, Parched and Sinking, Faces a Water Crisis," *The New York Times*, February 17, 2017, <https://www.nytimes.com/interactive/2017/02/17/world/americas/mexico-city-sinking.html>.

⁴ Ibid.

⁵ For a more detailed historical analysis see Comisión Nacional del Agua (CONAGUA), *Semblanza Histórica del Agua en México* (Mexico City: 2009), <http://www.conagua.gob.mx/CONAGUA07/Publicaciones/Publicaciones/SGP-28SemblanzaHist%C3%B3ricaM%C3%A9xico.pdf>.

⁶ Stephen Wilson, "Ecological Art," in *Information Arts: Intersections of Art, Science, and Technology* (Cambridge, MA; London: MIT Press, 2001), 131.

⁷ Wilson, 129.

⁸ T.J. Demos, "The Politics of Sustainability: Art and Ecology," in *Theory in Contemporary Art since 1985*, ed. Zoya Kocur and Simon Leung, 2nd edition (Chichester, UK: Wiley & Sons, 2013), 468.

⁹ Demos, "The Politics of Sustainability," 471.

¹⁰ Demos, 473.

¹¹ T.J. Demos, *Decolonizing Nature: Contemporary Art and the Politics of Ecology* (Berlin: Sternberg Press, 2016), 7.

¹² Demos, "The Politics of Sustainability," 481.

¹³ Oliver Grau, "The Complex and Multifarious Expressions of Digital Art and Its Impact on Archives and Humanities," in *A Companion to Digital Art*, ed. Christiane Paul (Chichester, UK: Wiley & Sons, 2016), 23.

¹⁴ María Fernández, "Postcolonial Media Theory," *Art Journal* 58, no. 3 (Autumn 1999): 59.

¹⁵ Fernández, "The Complex and Multifarious Expressions of Digital Art," 70-71.

¹⁶ Stephen Wilson, *Information Arts*, 23.

¹⁷ Wilson, 27.

¹⁸ Guillermo Albarrán Ibarra, Eric I. Martínez Camacho, Misael Rodríguez Barrios, and Martín Valdés Estrada, "La contaminación del Río Lerma," 2015, <https://sites.google.com/site/lacontaminaciondelriolerma>.

¹⁹ Demos, *Decolonizing Nature*, 147.

²⁰ Ibid., 149.

²¹ Bruce E. Logan, "Exoelectrogenic Bacteria that Power Microbial Fuel Cells," *Nature Review Microbiology* 7, no. 5 (2009): 375.

²² Akshay D. Tharali, Namrata Sain, and W. Jabez Osborne, "Microbial Fuel Cells in Bioelectricity Production," *Frontiers in Life Science* 9, no. 4 (2016): 252-266.

²³ Demos, *Decolonizing Nature*, 148.

²⁴ Carlos Godínez Seone, "Pilas de combustible microbianas: depuración de agua y producción simultánea de energía," presented during I Jornada sobre innovación y optimización energética, Cartagena, Spain, June 5, 2008, <http://hdl.handle.net/10317/2655>.

²⁵ Mariana Pérez Bobadilla, "Imagination and Accountability: Grounding Possible Futures in Art and Biology Artefacts," presented at The Ammerman Center for Arts and

Technology 16th Biennial Symposium: Intersections, New London, CT, February 17, 2018.

²⁶ Karla Jasso, "PRSTS RBNS / PLNT-S NMD-S / PLNT-S TFTSNTTC-S," in *Gilberto Esparza: Cultivos*, ed. Gilberto Esparza (Mexico City: CONACULTA, 2015), 80-81.

²⁷ According to the archive of the Biennale, between 1956 and 2007, Mexico participated in Venice only in few occasions, mostly as guest in the pavilion of the Italo-Latin American Institute. However, there have been other participations that have not constituted national pavilions, for instance the 2003 project *Il quotidiano alterato* [The Everyday Altered] curated by Gabriel Orozco for the Padiglione Italia, featuring works by other Mexican artists such as Abraham Cruzvillegas, Daniel Guzmán, Damián Ortega, and Fernando Ortega.

²⁸ Tania Candiani, interview by author, Venice, May 7, 2015.

²⁹ Delfín Montañana and Natalia Gálvez, "El sistema hídrico de la ciudad de México," *Ciencias*, no. 107/108 (July 2012/February 2013) 12.

³⁰ *Ibid.*

³¹ "Nos guió, y nos guía todavía, la falsa modernidad basada en destruir todo vestigio de naturaleza que se opone al predominio del automóvil." Jorge Legorreta, "Los ríos de la ciudad de México: pasado, presente y futuro," *Ciencias*, no. 107/108 (July 2012/February 2013): 21. Translated by the author.

³² *Ibid.*, 22-23.

³³ Luis Felipe Ortega, interview by author, Mexico City, March 2015.

³⁴ José Luis Barrios, "De arte, bienales y espacios," in *Possessing Nature: Tania Candiani and Luis Felipe Ortega*, ed. Karla Jasso (Mexico City: INBA, 2015), 47.

³⁵ Barrios, "De arte, bienales y espacios," 49.

³⁶ Barrios, 50.

³⁷ Gilberto Esparza, ed., *Gilberto Esparza: Cultivos* (Mexico City: CONACULTA, 2015), 251-68.

³⁸ Cuahtémoc Medina, "Contemp(t)orary: Eleven Theses," *e-flux Journal* 12, What Is Contemporary Art? Issue Two, January 2010, accessed December 2017, <http://www.e-flux.com/journal/12/61335/contemp-t-orary-eleven-theses/>.

³⁹ *Ibid.*

⁴⁰ *Ibid.*