UNFOLDING ENTANGLED INFRASTRUCTURES

FEMKE HERREGRAVEN'S *MALLEABLE REGRESS*

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At the 2016 London Sunday Art Fair, visitors would stumble upon a number of rectangular plastic slabs, spread across the gallery floor (fig. 1). The transparent slabs of Femke Herregraven's *Malleable Regress* (2016) were beautifully structured by what resembled a frozen moment of blue pigment dissolving in water, creating swirls and turbulence. Looking closer, one could identify an imprint on some of the slabs, featuring the letters TJIPETIR, and a small acrylic tube embedded in each slab labelled with geographic coordinates (fig. 2). Resembling a common (slightly enigmatic) post-conceptual art installation, why would this work lend itself as a case in point concerning technological imaginations? In this article, I argue that while the work does not actually implement a particular technological apparatus or automated process, it inserts itself into a complex system and history of interrelated technological and geopolitical imaginations and developments. Rather than tackling a specific technology, it tackles entangled infrastructures, emphasizing the fact that technology is always embedded and situated, bound not only to hardware but also to resources, environments, and political and social systems. As such, it also challenges established narratives of art and technology, at the same time broadening their scope and blurring their boundaries.

The Future Envisioned

It is the letters TJIPETIR and the coordinates on the acrylic tubes that turn out to be subtle hints to a multi-layered system of references materialized in Herregraven's *Malleable Regress*. The coordinates indicate several of countless locations across the globe, which, in 2010, have been identified by two MIT researchers as potential nodes of an envisioned future financial trading infrastructure. This system would allow for even higher performance of automated trading, which constitutes the majority of all trading transactions already today.[1] In so-called high-frequency trading, digital algorithms continuously survey the global financial traffic. On the basis of their analysis, they trade shares at very high-speed, profiting from often only momentary and tiny price fluctuations and differences at the various stock exchanges across the globe. If travelling on fast information routes, orders can literally overhaul others that travel on slower connections. They can thus be issued later than and in reaction to a specific order, but arrive at their destination before and thus anticipating it, allowing for subtle profits. Researching ways to make this form of trading even more profitable, the MIT scholars suggest that 'there exist optimal intermediate locations between trading centres [...] such that coordination of arbitrage trading from those intermediate points maximizes profit potential in a locally auditable manner.'[2] However, they call

1 Sean Cubitt, *Finite Media. Environmental Implications of Digital Technologies*, Durham and London: Duke University Press, 2017, p. 101.

2 Alexander D. Wissner-Gross and Cameron E. Freer, 'Relativistic statistical arbitrage', in: *Physical Review* E 82:5 (2010), pp. 056104-1-056104-7 (056104-1).

←fig. 1 Femke Herregraven, *Malleable Regress - Arctic*, 2016, eight cast polyurethane rubber tiles, pigment, acrylic tubes, bauxite, granite, aluminium, Iceland spar, desert sand, carbon, fibre, magnets, 28.5 × 33.5 × 2.5 cm, © Femke Herregraven.

←fig. 2 Femke Herregraven, *Malleable Regress - Arctic*, 2016, detail of slab, © Femke Herregraven.

their readers' attention to the fact that 'while some nodes are in regions with dense fibre-optic networks, many others are in the ocean or other sparsely connected regions, perhaps ultimately motivating the deployment of low-latency trading infrastructure at such remote but well-positioned locations'.[3] The coordinates labelled onto the acrylic tubes on the slabs of Herregraven's installation indicate such remote positions, located in the Arctic Ocean. In a kind of metonymic reference to the envisioned high-frequency trading infrastructure, the coordinates thus turn the plastic slabs into imagined micro platforms — floating hubs of this very infrastructure.

The Future's Past Imagined

However, the slabs' arrangement on the floor does not at all suggest a promising high-tech infrastructure — on the contrary, they rather convey the impression of being neglected or discarded. We have to turn to Herregraven's interactive 3D environment, *Sprawling Swamps* (2016), to understand why so. In this abstracted simulation of the globe, Herregraven lets the visitors explore various fictitious infrastructures and scenarios. These are located on volatile territories such as sinking mud-volcanoes or arctic ice, locations which are neither land nor sea, and are therefore hard to pin down in a geopolitical system of nation states. The above-mentioned floating micro platforms feature as one of the scenarios in *Sprawling Swamps* (fig. 3). While we see a virtual simulation of one of the slabs rotating freely in orbit, a voiceover introduces us to the idea of the two MIT researchers as if already realized, albeit in a rather poetic tone: 'For long, drifting utopias never materialized, until financial markets got frustrated being stuck on land...' However, after having described the researcher's visions, the narrator ends the story as follows: 'Once neutrinos could be shot through solid rock, the drifting global infrastructure collapsed. Obsolete infrastructural fragments washed up on shores'.[4] This is what Herregraven stages in her installation. Being spread across the gallery floor, the slabs are presented as if washed up on a shore. The imagined floating micro platforms thus appear as a future past. The artist presents a not yet realized technology at the moment of already being obsolete, of turning into one of the many pieces of plastic waste being washed up at our shores daily.

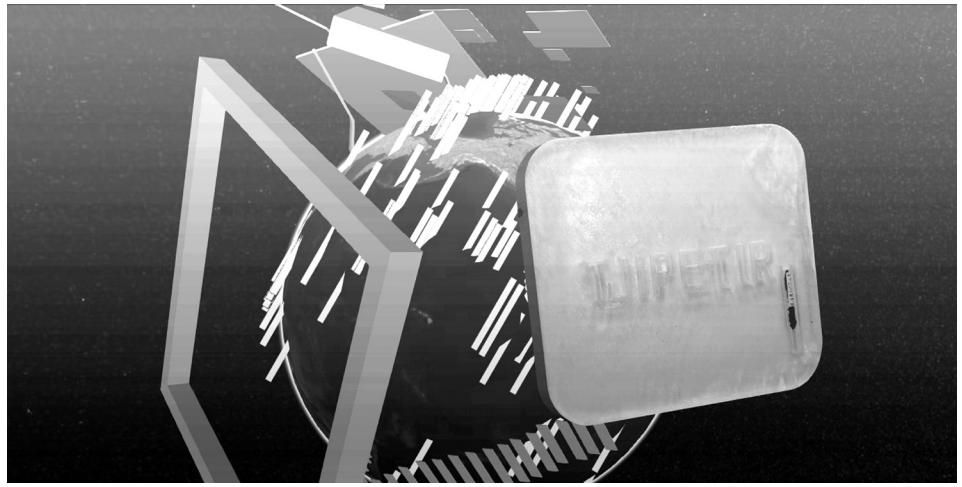
The Past's Presence Washed Up

But the installation alludes to flotsam also via a further detail, which is the letters TJIPETIR imprinted on the slabs. This time, it is not the potential future fate of a technology that is addressed, but its factual history. The imprint, but also the form of the slabs reference actual latex slabs that have been washing up at European shores since 2012: brownish rectangular pieces of solid matter, featuring the imprint TJIPETIR (fig. 4). Their appearance has led to the formation of a vibrant online community of beachcombers, treasure hunters and amateur researchers eager to trace the origin of the slabs.[5] They

3 Ibid., p. 056104-4.

4 Femke Herregraven, *Sprawling Swamps*, 2016, interactive virtual audiovisual environment, 'Horizon Relapse' chapter.

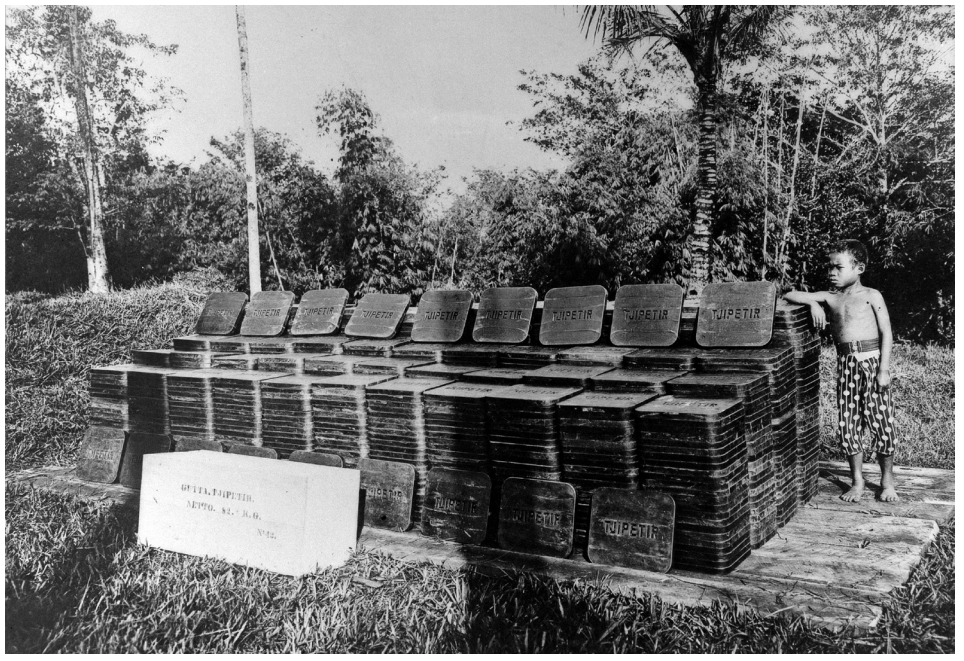
5 'Tjipetir Mystery' Facebook page. Accessed through: https://www.facebook.com/TjipetirMystery/about/ on 5 November 2017.



→fig. 3 Femke Herregraven, *Sprawling Swamps*, 2016–ongoing, digital installation, interactive 3D environment, video, audio, screenshot, © Femke Herregraven.

→fig. 4 Tjipetir block found at Porth beach on the outskirts of Newquay in Cornwall, UK, as posted on the Tjipetir Mystery Facebook page on March 31, 2013. Accessed through https://www.facebook.com/TjipetirMystery/ on 5 November 2017.

found out that the slabs stem from a latex factory in a village on the Island of Java, named Tjipetir. In the nineteenth century, a specific sort of latex, called Gutta Percha, had been discovered as ideal insulation component of undersea telegraph cables, due to its high resistance against sea water. Gutta Percha trees mainly grew in South East Asia, so that a bustling trade of Gutta Percha from the British, Dutch, and French colonies to Europe, where most of the undersea cables were produced, started. A photograph from the 1920s, preserved in the archive of the Tropenmuseum in Amsterdam (the 'Museum of the Tropics', a former colonial institute) shows a stack of Gutta Percha slabs outside the Tjipetir factory, resembling exactly those which have been washed up at European shores (fig. 5). It was concluded that the latter must stem from a shipwrecked on its way from Java to the West presumably a hundred years ago and that they were washed up recently due to presumed



→fig. 5 A stack of Gutta Percha slabs in front of a factory in Tjipetir. Photograph from an album offered to H. van Lennep (director of the 's Lands Caoutchoucbedrijf and 's Lands Kina- en Theebedrijf), on the occasion of his 25th anniversary, December 12, 1937. Collection Stichting Nationaal Museum van Wereldculturen. Coll.nr. TM-10012863

degradation of the wreck.[6] In taking the TJIPETIR slabs as models for the envisioned micro platforms, Herregraven points to the roots of global trading in colonial politics. But she also directly parallels recent attempts to speed up transatlantic communication with historic ones. Not only the current endeavours are mainly spurred by desires of financial trading; this was an important motor also concerning the installation of early submarine telegraph lines, which were the first means ever to allow for effective global financial trade. A 1931 article discussing high-speed duplex cables describes the demand for 'one minute service' as 'not a theoretical one, for without such service our brokers cannot take advantage of the difference in quotations on a stock on the exchanges on either side of the Atlantic'.[7]

Technologies' Longer Lifecycles

Instead of implementing an operating technology, Herregraven operationalizes three other states in a technology's lifecycle, hinting at a factual past, respectively a potential future state of one and the same complex infrastructural system. The Gutta Percha slabs are material remnants of historical wrought products once traded to be processed into insulation layers of the first telegraph cables. As wrought products, they stand in for a very early stage in the production cycle of a technology — even if presented as already outdated as of today. The coordinates stand-in for a not yet materialized idea, an envisioned future trading system. And, finally, the arrangement of the slabs on the floor alludes to a phase of obsolescence or decay, which, interestingly, is operative at two moments of the depicted scenario: it addresses both the prefigured future obsolescence of the micro

6 'Tjipetir Mystery' Facebook page, post reporting comment by oceanographer Curtis Ebbesmeyer, posted 7 February 2013. Accessed through: https://www.facebook.com/TjipetirMystery/ on 5 November 2017.

7 J. W. Milnor and G. A. Randall, 'The Newfoundland–Azores High-Speed Duplex Cable', in: *Transactions of the American Institute of Electrical Engineers* 50:2 (1931), pp. 389-396.

platforms and the actual obsolescence of the Gutta Percha slabs, leading to a slow retransformation of the slabs back into mere matter.

Furthermore, the reference to material decay is not the only component that brings physical matter into play in this installation. The acrylic tubes labelled with the coordinates each contain some powdered mineral.[8] These minerals stem from a geographic location nearby the indicated coordinates, thereby relating the calculated location to the nearest actual physical ground. This, in turn, hints at the artist's interest in the given physical and set geopolitical interrelations of volatile territories (such as the ocean surface) with solid ground, or, to use the words of Paul Edwards, in nature as 'in some sense the ultimate infrastructure' — a topic addressed more extensively in the *Sprawling Swamps* interactive environment.[9] In juxtaposing the geological foundations of geopolitics with the dynamic networks of information flows, the installation also connects the micro temporalities of high-frequency trading to the macro temporalities of deep time.

Hyperobjects

The slabs can be regarded as simple copies of the original TJIPETIR slabs, produced in a rather traditional manner (moulding and casting). However, what is copied or referenced is not only the object itself but the process of its appearance: being washed up on the shore. The slabs stand metonymically for the whole history related to the original objects, including their geopolitical context, their intended use, but also their unintended fate as flotsam, which in turn lent itself as an enigma enthusiastically taken up by amateur communities. Similarly, even their added parts constitute metonymic references to a complex interrelated infrastructure of global trade, communication networks, or geopolitical interdependencies. Through implementing both actual material remnants and scientific research, the installation actually inserts itself into what we might want to call the hyperobjects of both global financial capitalism and global telecommunication. Philosopher Timothy Morton had coined the notion of hyperobjects to denote 'things that are massively distributed in time and space relative to humans' characterized by being 'viscous' (closely affecting the human individual), 'non-local' (geographically spread), 'interobjective' (interrelating various objects) 'temporally undulated' and 'phased' (covering extended time-spans, not graspable as a whole in one singular moment).[10] He emphasizes that hyperobjects are far from being 'figments of (human) imagination', but rather 'real whether or not someone is thinking of them'.[11] While I agree with Morton that these complex entities are real rather than imaginary, I hold that imagination can still form an important part of a hyperobject proper. Just as raw material constitutes an essential part of technology understood as infrastructure, so do the acts of its conceptualization, research and development, and even artistic imaginings.

8 They also contain a small magnet, which — according to the artist — stands in for the potential technology installed on the microplatforms. Personal conversation with the artist on July 22, 2017.

9 Paul Edwards, 'Infrastructure and Modernity', in: *Modernity and Technology*, 2003, p. 196, quoted in Lisa Parks and Nicole Starosielski, *Signal Traffic. Critical Studies of Media Infrastructures*, Urbana, Chicago, and Springfield: University of Illinois Press, 2015, p. 55.

10 Timothy Morton, *Hyperobjects. Philosophy and Ecology after the End of the World*, Minneapolis: University of Minnesota Press, 2013, pp. 1, 27-95.

11 Ibid., p. 2.

Technologies Touching upon Art

If we take the actual algorithmic workings of high-frequency trading, or the imagined telecommunication network based on micro platforms as our references, we have to state that Herregraven's installation does not use or develop technologies proper, neither do they enable her work the way that internet technology enables net.art or GPS technology enables locative media art. Herregraven is neither interested in speculatively designing prototypes of functioning micro platforms nor in visualizing the actual technical workings of some telecommunication or financial trading technology. How does such a work fit into the history of artists tackling technological imagination? Long before what has come to be called new media art emerged, artistic movements such as Futurism and Constructivism have addressed the promises of new technologies. But it is mainly since after WWII that artists have begun to actually use or implement 'new', electronic technologies to create work. As an example, concerning telecommunication technologies, in the pioneering work *The World in 24 hours* (1982), Robert Adrian X organized a telecommunication performance, inviting groups in various time-zones across the globe to share textual, sonic, and visual messages (using, amongst other technologies, Slow Scan Television and Telefax) at exactly 12 pm local time, reflecting on the physical limitations of real-time communication. This was a clear case of artists being fascinated by a specific new technology, developing their own visions, and actually making use of it for their works — and by doing so often also contributing to the overall development of the respective technology. While still today, artists continue to actively tinker with upcoming technologies, the field of new media art diversified early on. Already in 1998, Erkki Huhtamo contrasted positions of 'artist-engineers', which he saw emerging in the 1960s, with more recent roles of 'artist-archaeologists', who refer back to media systems of the past.[12] A prominent example of such media archaeological approaches would be Paul DeMarinis' *Messenger* (1998), an installation that re-enacts eighteenth-century visions of electrical telegraphs in order to display contemporary email traffic. As another category, we might want to add 'artist-data-analysts', who dedicate their efforts to visualizing data (traffic). Concerning internet traffic, two canonical works come to mind: Nathalie Jeremijenko's *Live Wire* (*Dangling String*) (1995), a simple plastic string hanging from the ceiling and being set into motion by internet traffic, and Joshua Portway's and Lise Autogena's *Black Shoals Stock Market Planetarium* (2001), which visualizes the stock market performance of companies as stars glowing brighter or dimmer on a projected night sky.[13] In addition, it features artificial creatures living from the profits of financial trading and thus having to survive in an entirely financial environment. All these works come with their own strategies of technological imagination, but they share the focus on a specific technological system in its moment of actual operation (even if re-enacted, as in media archaeological approaches).

12 Erkki Huhtamo, 'Time Traveling in the Gallery. An Archeological Approach in Media Art', in: Mary Anne Moser and Douglas MacLeod (eds), *Immersed in Technology. Art and Virtual Environments*, Cambridge: MIT Press, 1996, pp. 233-268 (243).

13 Mark Hansen, 'Ubiquitous Sensation. Towards and Atmospheric, Collective, and Microtemporal Model of Media', in: Ulrik Ekman (ed.), *Throughout. Art and Culture, Emerging with Ubiquitous Computing*, Cambridge: MIT Press, 2013, pp. 63-88 (70f).

Herregraven, on the contrary, extends the scope of her work by addressing the much broader life cycle of technologies, as well as their entangled technological, geopolitical, and ecological contexts. While she touches upon aspects of actual technological innovation in addressing the research of the MIT researchers, she does not use, bring forward, or tinker with the envisioned technology, as the artist-engineer might do. She also relates to media archaeology in referring back to the early state of telecommunication technology, but again without actually re-enacting the latter as DeMarinis did. Lastly, in *Sprawling Swamps*, she makes use of some kind of visualization to point to the global scope of the 'hyperobjects' she addresses, but not to visualize actual data traffic, but to visualize imaginations. Instead, in appropriating objects once serving a now outdated technology to imagine fictitious future technological scrap, Herregraven points to the endless circuits of imagination, innovation, production, distribution, use, obsolescence, disposal, decay, and oblivion which drive technological evolution. Furthermore, in focusing not so much on end-user devices but on raw materials and remnants of technological infrastructure, her work shifts the perspective from (individual) human-technology relations or specific technologies to the often very close interrelations of technological infrastructures, geopolitics, and the natural environment.[14]

Epilogue

On a final note, however, we should not forget, that — like any work based on (artistic) research in today's times — *Malleable Regress* is ultimately highly dependent on state-of-the-art communication technology. While the key components of Herregraven's installation are analogue objects, created by means of traditional techniques of moulding, casting, and assemblage, the work's topic is derived from the interrelation of knowledge from various disciplines and discourses, greatly facilitated by digital information networks. Not only did Herregraven learn about the ideas of the MIT researchers via online media, the entire 'TJIPETIR enigma' was unfolded by an online community of self-organized (amateur) researchers via a social media platform (Facebook), and it was through this platform that Herregraven was able to obtain some of the slabs to produce her moulds. In that sense, while coming about as an installation tackling entangled infrastructures but not in itself being dependent on a specific working technology, we could argue that in a broader sense the work is ultimately still dependent on the actual workings of the broader field of communication technologies it addresses.

14 As such, her work can be related to the upcoming subdiscipline of infrastructure studies, which, according to Lisa Parks and Nicole Starosielski, 'draw attention to media infrastructures' entanglements with environmental and geopolitical conditions, from the moment of installation through their residual uses.' Op. cit. (note 9), p. 4.

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