Part 4

CEMENTED RELATIONSHIPS

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What is implicit in the belief system of cement and what does this do to relationships? Cement's qualities of endurance, weight, stability and perceived permanence are valued in the making of modern life, particularly in the age of rapid and disorienting change. Concrete exemplifies the mastery of nature by humans, holding natural forces at bay, directing flow, keeping materialities separate. For Green (2015: 10), cement is imagined to be 'immune to all states of matter and matters of state'. The belief that cement is able to keep Earth's planetary processes separate and not be transformed by them through space and time confers on it 'god-like' properties, characteristic of human belief in our own exceptionalism, as if existing outside of its environment (Green, 2015). However, its imagined permanence of 1 000 years, akin to the Roman colosseums, is a disillusion. Studies have shown that cement, especially when reinforced with steel, has a much shorter life span because of climate change (e.g. extreme weather events) and corrosion from increased atmospheric carbon and chlorination, which causes acid rain (see Zivica & Bajza, 2001; Saha & Eckelman, 2014; Lee et al., 2018; Kaewunren et al., 2018). Increases in temperature can significantly impact the diffusion coefficient of carbon dioxide seepage into concrete (the rate of the chemical reaction between carbon dioxide and calcium hydroxide) and various chemicals dissolution in water. A critique of some of the models used to predict the lifespan of cement is that, while measurement of the material takes cognisance of the presence of degrading molecules such as acid rain, variation of climate such as global warming are not included in the calculations (Kaewunren et al., 2018). Many of these studies perpetuate a blind faith in cement, with some recommendations being to increase the tensile strength of the materials or increase the amount of concrete used to reinforce built infrastructure; this is the same logic and approach that City of Cape Town uses in its response to failing infrastructure.

My interest here is not to undermine the role of cement in providing services to people, but rather that the narrow focus on the materiality of cement, outside its entanglement with multi-species worlds and society, makes it seem like a neutral substance, an indifferent object that exists in isolation in 'extra-terrestrial zones' (Green, 2015). But it is not. Its manufacture requires the mining of limestone, shale, silica and iron, brutal processes of extraction that degrade the environment and produce high carbon emissions, while its use requires the removal or covering of living material. In the case of Cape Town, tonnes and tonnes of sand are mined from the sand dunes along the coast to make cement structures, ironically making the city more vulnerable to the sea level rise that attends global warming.

a. 

b. 

Images 1 a-b: Location of sand mining sites in close proximity to the Zandvliet WWTW. (Source: Google Earth 2020)

In the images above, the growth of the mining area behind the Zandvliet WWTW can be seen expanding towards the sea. This places the WWTW, a billion-rand investment, at considerable risk in the coming years. A study commissioned by the CCT (City of Cape Town Coastal Management Report, 2015) and a report generated by the CCT's Environmental management, Coastal Management Branch (2017), which have since been ignored, indicated that dunes that are stripped of vegetation cover have their natural processes of trapping and retaining windblown sand compromised. When the sand dunes can no longer trap and retain sand, it affects the advancement and retreat of dunes, compromising their ability to act as effective coastal barriers. Should the sea levels continue to rise as anticipated, seawater will eventually breach what remains of the dunes, making the infrastructure susceptible to flooding and causing the salinisation of the Cape Flats Aquifer (CFA). The 2020 flooding of the Sandvlei community, when the Kuils and Eerste riverbanks broke after heavy winter rains, also indicates a real risk to this project. The WWTW could be flooded by seawater on one side and freshwater on the other. The rise in sea level is also likely to affect the freshwater that flows in the Kuils and Eerste Rivers close to the rapidly degrading sand dunes, compromising the soil's productivity for local farming communities and for one of the last remaining farmlands within the Cape Town metropole, the Philippi Horticultural Area (PHA), which relies on CFA groundwater for irrigation.

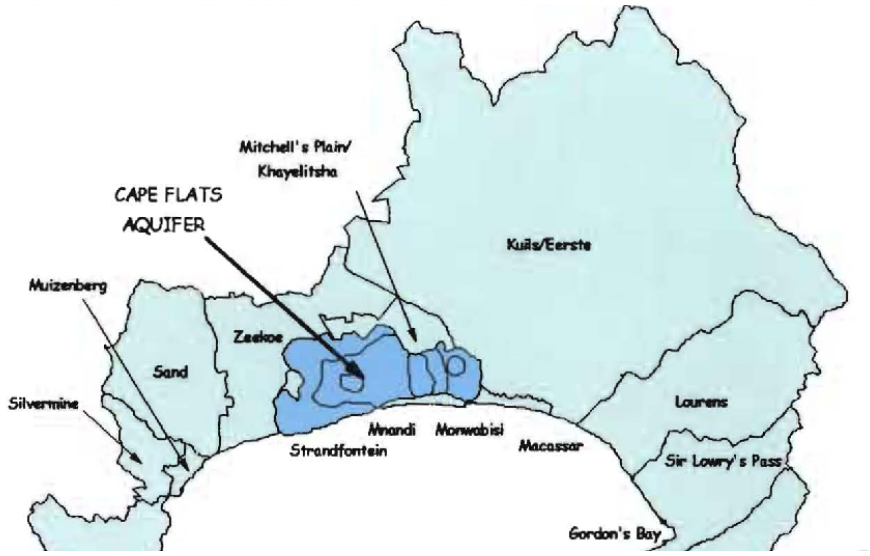

Image 3.4 Location of the Cape Flats Aquifer. (Source: Giljam, 2002)

The cheapening of nature has occurred over centuries in the Cape and was made even more visible during my field research. The upgrades of the Kuils River infrastructure and, particularly, of the Zandvliet WWTW came at a cost to the endangered sand dunes of the False Bay coastline, which have been mined for decades to manufacture cement. Cape Town's coastal line is made up of rocky shores separated by small beaches and long sandy coasts. Many of the sand dunes are considered migratory due to the often forceful seasonal winds that influence the sand deposits and erosion of the summer months (particularly from January to March) and the strong gale force winds of the wet winter months (May to August). Prior to urban development, the mobile coastal dune systems were extensive, but the dunes have been transformed and compromised over the last few centuries, especially in the last 80 years, endangering plant and animal life unique to the Cape coastal region (IOL News Call for probe into Macassar Dune Mining, 2008; CCT Coastal Management Report, 2015; CCT, 2019)

All the surviving sand dunes in Cape Town, including those that are degraded and threatened, form essential buffers against weather elements that affect human-made infrastructure (e.g. buildings and roads), rivers, wetlands and aquifers around the city. The dune plumes that extend up to 15km inland along the False Bay coast, where the lower section of the Kuils River flows and the Driftsands Nature Reserve is located, were formed over millennia, a result of intense winds causing calcareous and, to a lesser extent, barchanoid dunes to form (Cape Nature, 2015). As these dunes migrate inland, they become stabilised by vegetation. However, due to the boom in infrastructure development over the last few decades, these mineral-rich dunes have been

extensively depleted, leaving a fraction of what was previously there along the coast, with some dunes only surviving because of their location in protected areas such as the Driftsands Nature reserve. The role of these dunes as essential 'green infrastructure' has been underplayed or largely ignored, perhaps due to the influence of the multi-billion-rand construction industry. The mining of these dunes has been largely unregulated and, according to the CoCT's own report (2015), few dune-management plans are in place due to the coastal management portfolio being 'historically neglected and under-resourced, often to the cost of the City and its ratepayers' (CCT Coastal Management Report, 2015).

In addition to protecting human-made and natural landscapes from surging storms, these dunes provide a habitat for a host of multi-species communities and regulate environmental and weather conditions (providing green spaces in an urban jungle). The exploitation of these dunes without active management intervention has resulted in fewer and fewer natural dunes (CCT Coastal Management Report, 2015). While the landscape is changed by more layers of concrete in the name of 'development' and 'upgrades', the marine environment and climate conditions function as they always have: sand is naturally deposited along the coast; strong seasonal winds blow the sand inland, changing the expected profile of the sand dunes; copious amounts of sand are deposited on roads and buildings; and the changed shape of the dunes makes them more susceptible to erosion, so the vegetation that usually stabilises the dunes can no longer establish itself.

The reliance on concrete to upgrade the urban environment, devoid from its relationship to dunes and temporal scales, ignores the vital flows of materials, energy and nutrients that make up urban ecosystems and facilitate urban metabolisms. The authority of this understanding of cement also overshadows the experience of residents in areas like Sandvlei, Milnerton and Zeekoevlei, which have had to endure the most effects of failing infrastructure. In addition, the upgrade of the WWTWs, which is costing billions of Rands (in loans), is premised on a fixed population and a fixed understanding of urban metabolisms. What happens in another 10 years, when the population of Cape Town has significantly increased again? Will another loan be taken up to upgrade failing or overwhelmed infrastructure? Given the many unknowns of climate change, what will happen in 20, 50, 100 years?

While water is deemed a precious resource and a human right, clearly only particular waters fit into this framing of a 'precious resource', and the humans that are able to pay for water are

automatically given the right to access it. The focus on potable water provisioning has seen billions of Rands of investment into mega-infrastructure projects, such as dams and water pipelines, over the last 40 years, with repairs, refurbishment and the clearing of invasive alien plants a priority to facilitate the movement of water over vast distances, particularly during the drought of 2016/2017. Streams such as the Kuils, lakes such as Zeekoevlei and lagoons such as Milnerton, are not envisioned as part of this precious resource and are not given the same protections. Sewer leaks take longer to attend to, and wetlands, particularly in the Kuils, have been diminished to make room for faster and more efficient wastewater flow into the environment from upgraded WWTWs (with increased volumes of often poorly treated effluent). Interventions highlight different versions of water planning: one for potable water and the other for waste removal, as if these are not part of the same urban water cycle. These interventions are further delineated by technical interventions, which constrain the ideas of what water is and what it means, and, by extension, what the river or lake is and what it means. As such, the water that flows in the many of Cape Town's water bodies are positioned and understood as a dilutant for waste and not suitable for human contact. Technical interventions such as canals, stormwater drains and bridges are used as barriers to 'protect' people from these waterbodies. These interventions also shape temporal rhythms of flow and natural cycles – how people move in, around and along them and how capital flows and politics are shaped in the City.

Although infrastructure can be valuable and even essential for addressing basic human needs, technical approaches are often limited, and those who produce them are generally blind to the power embedded in them. They are presented as neutral approaches to addressing societal problems, failing to also account for infrastructure's conceptual and material capacities. As such, in the current moment the Kuils River, Zeekoevlei amd Milnerton lagoon present as paradoxes of infrastructural management, where technical responses to sewage and waste disposal problems are often incommensurate with addressing histories of (un)settlement, controlling the movement of people and the environment, unequal service provision and environmental justice in the everyday at grassroots level. With the advent of democracy and the inclusion of the majority of the population in service delivery and a focus on shifting to more sustainable cities, the place and role of the urban waterbodies as a necessary extension of Cape Town's waste infrastructure must be rethought. Coupled with growing climate uncertainty and the effects of the severe Cape Town drought in 2016/2017, infrastructural planning strategies for the future must include how these waterbodies are managed and interacted with and how it shapes everyday practices.

During the Keynesian era, development in the global North was evidenced by the installation of infrastructure to serve various human needs, but they are having to deal with its failure decades later (Howe et al, 2016). In the global South, 'a high-functioning Keynesian infrastructural apparatus never existed. It is important that we distinguish between infrastructure that goes to ruin and infrastructure that never was. In some parts of the world, persistent infrastructural breakdown, or total absence, is the norm' (Howe et al., 2016: 4). The Kuils River, Zeekoevlei and Milnerton Lagoon provide fascinating cases of the same, i.e. failing infrastructure contending with the absence of infrastructure and, in some cases, too much of it.

For instance, the use of infrastructure to separate the local communities from the Khayelitsha Wetlands Park (KWP) located along the Kuils River can be referred to as a 'metabolic rift', a concept developed by Clark and Foster (2010) as an ecological interpretation of Marx's theories on labour and separation from the land.

The concept of 'metabolism' is inherent in social relations with nature, as it highlights the relations, exchanges and flows between people and nature, providing the conditions for labour. Marx explains that there is a 'necessary "metabolic interaction" between humans and the earth' (in Clarke & Foster, 2010: 2). The particular social metabolism is currently run by 'the capitalist mode of production, which influences the material exchange between society and nature' (Clark & Foster, 2010). The very endurance of capitalism and neoliberal approaches to the economy and development depends on its extractive nature to perpetuate the modes of exchange that remove the work from the labourer.

Another example is of residents living near the Kuils River who have complained about respiratory problems since the re-opening of a steel processing plant owned by DHT Holding, trading as Cisco. The plant originally operated from 1960 to 2010 and was shut down until it was bought by DHT Holding in 2012. In this period, the Kuils River was largely farmland and had a significant buffer area between the steel mill and residential areas. However, when the mill shut down, housing developments sprung up in the area, and the buffer area between the mill and residential area had decreased to about 70 metres when the mill reopened in 2018. While the health of residents living in the area is cause for concern, city officials and owner of the mill are hesitant in linking the growing respiratory issues to the mill, as there is 'no proof' of a direct link to the plant's emissions. DHT Holding argues that a significant R550 million from the company and an additional R230 million from the Department of Trade and Industry went into upgrading the facility, which

included improving emissions from the plant. Moreover, the plant provides 300 jobs, which can ultimately improve the lives of locals. If there is already reluctance to conclude that emissions have affected the local human population, justifying an investigation into how air pollution has affected the river, transporting sediments downstream and into the ocean would prove even more difficult than proving harm to humans?

Image 1: Aerial photo of the Cisco steel mill in the Kuils River suburb, showing how close residential homes are to the mill (Source: https://www.iol.co.za/capeargus/news/kuils-river-residents-mad-at-steel-company-for-endangering-their-health-20607475.

In the cases of both the KWP and the steel mill, the state's management of natural resources using neoliberal rationalisations capitulates 'command and control' solutions under the guise of economic growth, economic efficiency and social development for marginal and low-income communities. In the discourse around 'green' development, the dominant claim is that many 'unpriced' and often unowned biophysical assets could, if inserted into global markets, create revenue streams able to support much needed socio-economic development (Dempsey & Robertson, 2012). This is the current discourse around the development in many parts of Cape Town. However, this approach fails to allow for adequate engagement in understanding the activities, importance and meanings drawn from the interaction with the KWP in particular and the various ecological processes in general. The services provided by the KWP cannot be separated from their embodiment in beings and lives. The benefits of the conservation, preservation and restoration of the KWP are often largely accrued by the state, private entities (e.g. tourist agencies) and donors, and less so by the locals. Neoliberal environmental policies based on scientific

knowledge, in many ways like their economic counterpart, are grossly inadequate in addressing poverty and inequality.

THE NEOLIBERAL CITY

The main thrust of the neoliberal era is to use market mechanisms and technological fixes as a solution to environmental problems. For neoliberalism, it is essential that the economy and governance systems are run separately so that markets can increasingly determine everyday life. This requires less interference by governments in how markets are run, and so less funding is put towards government services and paradoxically there is a shift towards the privatisation of government services. Government services are then run like a business and citizens become customers, as with the Department of Water and Sanitation. But what of those who cannot afford the tariffs charged for water? In a neoliberalised Cape Town, the rights to freedom and democracy have been traded for the freedom to buy and consume for those citizens who can afford to. Ripple effects of this 'freedom' are the unequal distribution of and access to services, nature being seen as cheap and unfair labour practices, affecting how people are seen, identified and treated. In a neoliberal system, government services become corporatised, and citizens have to shop around for services such as schools, parks, water supply and even in cases of emergencies like social and natural disasters.

Key to the neoliberal agenda is the presentation of the public sector as under-equipped and unable to deal with the challenges experienced in society, suggesting that the only way for society to succeed is through the corporatisation of municipal services. Ironically, despite the environmental crisis we are in, markets are never blamed for rates of consumption; instead we are told that individual citizens must shop differently and consume better, while the 'new' economy is greenwashed but continues to operate under the same principles as before. This was evident in the drought period in Cape Town, from about 2016 to 2017, when water tariffs were raised to meet the demands of the city and to find or create alternative water sources, such as underground water and desalinated sea water. Citizens were encouraged to reduce their water consumption to less than 600 megalitres a day, which was achieved. The dams filled up again in the winter of 2020 and were almost 95% full at the time of writing, but the City has stated that a reduction in tariffs would be dependent on the consumption rate. Mayoral committee member Xanthea Limberg highlighted that:

> It is important that the City cover its costs to ensure that the maintenance and augmentation programmes can be carried out. The current tariffs are for the projections and realities of the 2020/21 financial year. Costs of providing water to the City stay similar, even if residents drastically reduce consumption, and if maintenance is delayed, it can cause much more serious and costly problems down the line. This service includes maintaining a 11 500 km water network, 9 500 km sewer infrastructure, 5 600 km stormwater pipelines, 490 wastewater pump stations and 23 wastewater treatment works. (IOL News, City of Cape Town will not lower water tariffs despite dam levels being at 95.6%, 2020).

The neoliberal agenda is to privatise profits and socialise costs; there is a disconnect between the theory of neoliberalism and its actual practice and manifestation. If things go wrong in the markets, such as poor preparation for the drought, markets are held blameless and responsibility falls on the government or individual citizens. The free market espouses a level playing field, entrenching personal responsibility: if you are poor, it is your fault; if we run out of water, it is your fault.

The counterview holds that these market mechanisms and a strong belief in technological progress are themselves the main cause of environmental degradation (York & Rosa, 2003), but whether this ecological turn will go beyond the greenwashing of 'ecological modernisation' perspectives remains to be seen. A major challenge in addressing ecological crises is thus in how governance happens. Current governance of the environment refers to landscapes as space, as if it exists outside of planetary cycles (Green, 2020, RtA class seminar). The Human's theory of urban environmental management is to 'harden' the boundaries between solids, liquids and gas (Green, 2014), in much the same manner that we have hardened disciplinary divides.

In conclusion, 'hardening' and cemented relations are a useful aid to thinking about cement, which is used to control water's flow and is a barrier to its relationships to landscapes and sedimentation processes. Cement often takes water out its relationships with plants, fish, frogs and soils, imposing a divide between solid and liquid forms of the river, and the atmosphere is seldom thought of. Cement hardens the boundaries between ecological relationships, but the logics of equivocation in terms of discourse on progress and development are also cemented into how space is imagined, as if land is distinct from river, river is separate from air, and so forth.

References

Cape Nature. 2015. *Driftsands Nature Reserve Complex PAMP*. Cape Nature Report. https://www.capenature.co.za/wp-content/uploads/2014/05/DRFS-PAMPS_merged-1.pdf.

Accessed 18 June 2020.

City of Cape Town Coastal Management Report. 2015. Dune Management in *Coastal Management programme.* https://resource.capetown.gov.za/documentcentre/Documents/Project%20and%20programme%20documents/CCT_CoastMngtProg_Chapter_20_Dune_Management.pdf

City of Cape Town Environmental Management, Coastal Management Branch. 2017. *Maintenance and Management Plan: Dunes and Beaches.* https://resource.capetown.gov.za/documentcentre/Documents/City%20strategies%2C%20 plans%20and%20frameworks/CCT_Dunes_and_beaches-MMP.pdf

City of Cape Town. 2019. *Draft Cape Flats District Baseline and Analysis Report 2019: State of the Environment.* https://resource.capetown.gov.za/documentcentre/Documents/City%20research%20reports%20and%20review/Draft-CapeFlats-BaAR2019_Environment.pdf

Clark, B. and Foster, J.B. 2010. Marx's Ecology in the 21st Century. *World Review of Political Economy* 1, 1 (2010): 144

Demspey, J. and Robertson, M.M. 2012. Ecosystem Services: Tensions, impurities and points of engagement within neoliberalism. *Progress In Human Geography*, 36 (738): 758 – 779.

Giljam, R. 2002. The effect of the Cape Flats Aquifer in the water quality of False Bay. (Unpublished Master's Thesis). University of Cape Town. Cape Town.

Green, L. 2015. The Changing of the Gods of Reason: Cecil John Rodes, Karoo Fracking and the Decolonizing of the Anthropocene. *E-flux journal* 65(Supercommunity). https://www.eflux.com/journal/65/336591/the-changing-of-the-gods-of-reason-cecil-john-rhodes-karoofracking-and-the-decolonizing-of-the-anthropocene/

Howe, C., Lockrem, J., Appel, H., Hackett, E., Boyer, D., Hall, R., Schneider-Mayerson, M., Pope, A., Gupta, A., Rodwell, E., Ballestro, A., Durbin, T., el-Dahdah, F., Long, E. and Mody, C. 2016. Paradoxical Infrastructures: Ruins, Retrofit and Risk. *Science, Technology and Human Values*, 41(3): 547-565

IOL News. 2008. Call for probe into Macassar Dune Mining. *IOL News.*

https://www.iol.co.za/news/south-africa/call-for-probe-into-macassar-dune-mining420717

IOL News. 2020. City of Cape Town will not lower water tariff despite dam levels being at 95.6%. *IOL News.* https://www.iol.co.za/news/south-africa/western-cape/city-of-cape-town-will-notlower-water-tariffs-despite-dam-levels-being-at-956-549d8ca0-277b-4a5e-a8450d28968e2639

Kaewunruen, S. Ishida, T. and Remennikov, A.M. 2018. Dynamic performance of concrete turnout bearers and sleepers in railway switches and crossings. *ASTM Advances in Civil Engineering Materials*, 7 (3): 446-459

Lee, H., Lee, H., Min, S and Lim, S. 2018. Carbonation-Induced Corrosion Initiation Probability of Rebars in Concrete with/without Finishing Materials. *Sustainability* 10 (10): 1-15. DOI:10.3390/su10103814

Saha, M. and Eckelman, M.J.. 2014. 'Urban scale mapping of concrete degradation from projected climate change', *Urban Climate*, vol. 9, pp. 101-114. http://doi.org/10.1016/j. uclim.2014.07.007.

York, R. and Rosa, E.A. 2003. Key Challenges to Ecological Modernisation Theory: Institutional Efficacy, Case Study Evidence, Units of Analysis, and the Pace of Ecoefficiency. *Acoustics, Speech, and Signal Processing Newsletter, IEEE*, 16(3):273-288. DOI:10.1177/1086026603256299

Zivica, V. and Bajza, A. 2001. Acidic Attack of Cement-Based Materials—A Review. Part 1. Principle of Acidic Attack. *Construction and Building Materials*, 15: 331-340. https://doi.org/10.1016/S0950-0618(01)00012-5