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DEADLY AFFAIRS

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DEADLY AFFAIRS

Antonia Alampi

“Human actors strive to interpret, define, or contain the toxic, but how are they also acted upon? Or (...) what happens when “the dump is in us”? What is the duality of contamination that emerges when we think of toxicity as an ongoing and morphing process?”¹

Sometime in 2018, in Florence, I joined a guided tour at the Uffizi Gallery by art historian Ingrid Greenfield², which highlighted the role that trade between Africa and Europe had in the stylistic development of the Renaissance. Suddenly, a heated debate ensued about the use and the meanings of the colour white. White skin, white light, white textiles and dresses, so overtly present in much of Western painting history, was also not exclusively related to artworks with religious overtones. The discussion revolved around the fact that the role of white as representing purity, sanctity or innocence is a predominantly (yet not exclusively) Western cultural attribute, while in many other cultures it can represent exactly the opposite. Once we were home, my mother – an artist with a deep knowledge of painting and sculpting techniques – handed me Victoria Finlay’s book on pigments, ‘Color: A Natural History of the Palette’³, which is about the significance of certain colours, and particularly where they come from and what their uses have been throughout history. White, of course, has had different meanings, and still does. Finlay mentions how *“in China and Japan the colour represents death and sickness in general and funerals in particular – and for some this is a more appropri-*

¹ Chloe Taft, (March 2016), ‘What is TOXIC?’, Response to ‘TOXIC: A Symposium on Exposure, Entanglement, and Endurance’, New Haven, Connecticut. Accessed on November 2018, <http://www.toxicsymposium.org/conversations-1/2016/3/21/3ggqmt8rnq1qsl443mibknvjdatlg> (website now expired).

² The guided tour was part of Black Archive Alliance an initiative to document African diaspora in Tuscany.

³ Victoria Finlay, (2003), ‘Color: A Natural History of the Palette’, London, Penguin Random House



Various Artists, ‘toxiThropea’, (2018), photo by Chantal van Rijt, courtesy of the artists

ate way to think about the colour.”⁴ Writing here about the significance of the colour white throughout different cultures would lead me off track, but the reason why I am introducing this is that the by-product of my research on the symbolism of white led me to discover something else: most pigments used by artists throughout history have had, in one way or the other, a toxic component, and white pigment was particularly poisonous. Hence the association of white with death seems to be definitely a more apt one than any other. I was not entirely surprised by this discovery, as it was something I felt I always knew – first of all due to (oil) pigments’ smell and the headache I would get after being subjected to their fumes for prolonged amounts of time. However, reading about the degree of some of their poisonous effects still produced a deep astonishment in me. The only way I can encourage the reader to feel that same sense of bafflement is by presenting more closely some aspects of one of the many stories contained in Finlay’s publication.

The greatest of white pigments⁵, by which I mean a type of white that was used in illustrious paintings spanning time and geography – from ancient Chinese, Egyptian, Greek and Roman empires to the Tuscan Renaissance, Flemish painters, and up until a few decades ago – had a heart of lead: a highly toxic metal and a very strong poison. Lead is found naturally in the Earth’s crust. It is a “*cumulative toxicant that affects multiple body systems (...) it is distributed to the brain, liver, kidney and bones. It is stored in the teeth and bones, where it accumulates over time.(...) Its widespread use has resulted in extensive environmental contamination, human exposure and significant public health problems in many parts of*

⁴ Victoria Finlay, p. 108

⁵ The account is based on the chapter ‘White’ in Victoria Finlay, pp. 108 to 133

the world”⁶. Lead poisoning includes damages to the brain, from memory problems to irritability, as well as headaches, constipation, and sterility. In severe cases lead poisoning can result in “*anemia, seizures, coma, or death*”.⁶ Lead has a low melting point, it is malleable, ductile, found in great quantities, and is relatively cheap. Thus, it has been used throughout history to make all sorts of things, from construction elements to paint. Lead white is a carbonate of lead, produced by its reaction with acids.⁷

Artists from various parts of the world have been using this white pigment (in forms such as “flake white”, “Cremnitz white”, “blanc de plomb”, etc.⁸) for multiple uses, from the making of primers for their canvases, to the mixing and preparation of other colours and to refine the most delicate details.

The counterpart to the inimitable gleamy look of this particular white is that it has killed or heavily intoxicated a myriad of artists, but even more so slaves, assistants, and later interns working in their studios. But it doesn’t stop at that. The most deadly of its uses was when it was mixed with other substances to produce women’s makeup products, such as skin foundations and fillers. Common already since ancient Egyptian times, it was employed by Roman ladies and Japanese Geishas, among others, until the 19th century. The initial effects of this poisonous substance fit the beauty parameters of the time in certain regions of the world; it would make women more pale, ethereal, like some sort of supernatural (whiter than white) spirits. By the time women would realize the effects of the toxin – after they had stopped sleeping, suffered of constipation, been unable to eat and hence lost substantial weight, developed blue spots all over their bodies, experienced kidney col-

⁶ World Health Organization

⁷ Victoria Finlay

⁸ See for instance here <https://colourlex.com/project/lead-white/>

⁹ Louise Cilliers and Francois Retief (2014), 'Lead Poisoning and the Downfall of Rome: Reality or Myth?', in 'History of Toxicology and Environmental Health Volume 1 in Toxicology in Antiquity', ed. Philip Wexler, p. 118

¹⁰ For example through the International Labour Convergence on Lead White organized in Geneva in 1921, to adopt the White Lead Convention. The convention led to the prohibition of the use of white lead in indoor painting in several countries. It is only since the Basel Convention in 1994 that lead white for pigments has been prohibited in certain quantities in the European Union. Retrieved from <http://www.basel.int/>

lapse, and various psychic disorders – they would be at death's door.

What is striking in this story is that the poisonous effects of this pigment are known since at least the Roman empire, Pliny the Elder already included information about lead white in his *Natural History*⁹. Despite this, it was only over the course of the 20th Century that this paint was deemed illegal in many countries,¹⁰ and that its distribution in the West ended (although it is still sold on the black market in many cities, including Antwerp). This, however, does not mean that it is not being distributed elsewhere in the world as I write. Sadly, if it becomes illegal to poison someone in your own country, the most common thing to do is to find another place of production where such regulations can be circumvented¹¹.

The argument for its prolonged and sustained use was that there was nothing else that would bless artworks with the same types of effects. With this I mean the bright tonality and reflective capacity, the light and shine, the fast drying and the malleable density. To this reasoning, however, it is important to add that the people most affected by the toxic fumes of lead white paints were not only artists but also, or probably primarily, the lowest-wage workers hired in their studios to produce large amounts of this pigment for future use: "*Lead white was made by the poor and poisoned the poor*".¹² So it goes that in 1780, Monsieur Courtois (a science demonstrator) and Louis-Bernard Guyton de Moreau (a magistrate who would become famous as a chemist) decided to embark on finding a solution to this problem. After a few years of experimentation they finally found a new equally valuable white pigment made of barium

sulphate (later named "blanc fixe"). But the problem remained: most artists kept using lead white because the barium white was too expensive.

The history of lead white paint and lead poisoning is extremely ancient and complex, so here I want to turn your attention only to a few aspects of this story, which I find particularly meaningful when thinking about the nature of the toxic. One relates to the desire artists had to produce a creation that would possibly secure their fame for eternity, at the cost of their and others' lives. An urge for prestige, for realizing the best work of art possible, in which the final outcome would be immensely more important than any material consequences its making might imply. The hazards implied in the conditions of production of their work would be undertaken in the name of the ambitions of their achievements. Their desire could be defined as uncontainable, not even hindered by the threat of death.

I wonder whether this feeling, this strong and almost erotic impulse, this blind and determined wish, is something that lies at the core of the toxic, something that justifies the possibility and potentiality of its existence.¹³

Furthermore while we could think about eternity as timeless, the artworks produced were also transitory. There is no definite agreement whether or not lead white is the reason why many old paintings have deteriorated into darker colours.¹⁴ However, this is a possibility I want to consider here because this is something else that defines toxicity, namely, the unknown qualities of its performance. I am not talking about the performance of lead white per se, but want to use it instead as an allegory to address the fact that toxicity acts as "*an accretive and compounding*

and [https://en.wikipedia.org/wiki/White_Lead_\(Painting\)_on_vention,_1921](https://en.wikipedia.org/wiki/White_Lead_(Painting)_on_vention,_1921), all accessed on March 5 2019.

¹¹ See for instance how the techniques of legal circumvention are explored in Simone Müller, (2019), 'Hazardous Travels: Ghost Acres and the Global Waste Economy', contained in this cahier.

¹² Victoria Finlay, p. 123

¹³ This thought is inspired by a conversation between Elena Agudio, Olivier Marboeuf and Pallavi Paul in the context of 'Incantations: Ecologies of Darkness', (January 26 2019), which took place at SAVVY Contemporary.

¹⁴ Marine Cotte, Emilie Checroun, Wout De Nolf, Yoko

Taniguchi, Laurence De Viguier, et al.. (2016), 'Lead soaps in paintings: friends or foes?' in 'Studies in Conservation', Maney Publishing, 62 (1), pp 2-23.

process defined in relation to human actors, structural inequalities and landscapes"¹⁵, meaning that its forms and agency can neither be pinned down nor totally anticipated.

One more thing that the story above exemplifies is the fact that the toxic is not merely visible in the materiality of things, but rather it demands a *double gaze* in order to be understood because "*dangerous, hostile substances lie concealed behind the harmless facades*"¹⁶. Toxicity exists hidden behind the visible. It is not just contained within matter, but is "*stimulated, constructed, rehearsed and contested through a myriad set of social, epistemological, historical, economic, material, biological and governance systems and structures. Toxicity (...) has scales, sources and consequences that manifest in situated ways*".¹⁷ This is why it is so hard to grasp and so easy to spread. Its dissemination is violent and lethal, yet slow and unspectacular, as the relationship between cause and effect is hard to visualize. It produces cancers, physical and psychological malformations, contaminates water and land, and it exterminates animals and plants. Its violence takes time to emerge and acts and spreads in relation to other factors, and it is this prolonged time that makes it difficult to draw direct links between source and consequence and to hold anyone accountable for it. "*More than just a chemical change, the 'slow disaster' of toxicity is located in specific territories and premised upon and reproduced by systems of colonialism, racism, capitalism, patriarchy, and other structures that require land and bodies as sacrifice zones.*"¹⁸

It is a delayed violence that not everyone can afford to protect him or herself from. The threat of

unemployment or famine and everything embedded in these conditions, make it difficult for many to be preoccupied by its deferred harm. And this delay also allows for its causes to be concealed, because the toxic can go unnoticed for very long, or may never identified at all. For instance, many corporations have been consciously producing, distributing, and selling toxic materials in large scales, or have exposed their workers to highly toxic substances¹⁹. At the same time, however, very few of them have been found guilty or held responsible for the violence and deaths they have caused, and many continue to function by simply moving their activities and market outside of certain jurisdictions²⁰. Just like in the story of the artists and low-wage workers in their studios, there is always someone else, in a different and weaker economic, social or legal position that will bear the heaviest burden of its toxicity. What used to be the artist's assistant in his studio, is now a worker in a lower GDP country with a more flexible legal framework around the toxic²¹.

To go back to my introduction, the toxic can be defined as a by-product of something else: industrial production, artistic zeal, beauty ambitions, greedy capital accumulation, and most human vices. Its lethal scale is a man-made construction entangled with how certain humans live on this planet. Given that it is impossible to contain its advancement, what we believe is left to do is to embrace, understand, and engage with its presence on a broader scale. Understand and engage with its complex nature. This is precisely why we are doing this project, titled 'Deadly Affairs'.

¹⁸ Civic Laboratory for Environmental Action Research (CLEAR) and EDAction, 2017, Gaard, 2010; Lerner, 2010; Native Youth Sexual Health Network and Women's Earth Alliance, 2016 cited in Max Liboiron & Manuel Tironi & Nerea Calvillo

¹⁹ See for instance the history of Eternit in Maria Roselli, (2014), "The asbestos lie. The past and present of an industrial catastrophe", European Trade Union Institute, aisbl, Brussels

²⁰ Maria Roselli

²¹ Simone Müller

¹⁵ Chloe Taft

¹⁶ Ulrich Beck, (1992), 'The risk Society; Towards a new Modernity', Sage Publication, London, pp 72

¹⁷ Max Liboiron & Manuel Tironi & Nerea Calvillo, (2018), 'Toxic politics: Acting in a permanently polluted world', Social Studies of Science, p. 48



Hira Nabi, 'A Ship Story (as part of an Indian Ocean saga)', (2019), courtesy of the artist



Franziska Pierwoss & Siska, 'Im Amerika', (2015/19), video still, courtesy the artists



Boris Anje, 'Conscious us 1', (2017-2018), courtesy of the artist

THIS PROJECT

"Sometimes we drug ourselves with dreams of new ideas. The head will save us. The brain alone will set us free. But there are no new ideas still waiting in the wings to save us as women, as human. There are only old and forgotten ones, new combinations, extrapolations, and recognitions from within ourselves – along with the renewed courage to try them out."

"There are no new ideas. There are only new ways of making them felt." Audre Lorde, *Poetry is Not a Luxury*²²

This cahier and the exhibition that gave birth to it, both titled 'Deadly Affairs', are the outcome of an ongoing dialogue with Caroline Ektander and Simone Müller, researchers from the Rachel Carson Center Ayushi Dhawan, Maximilian Feichtner and Jonas Stuck; Bonaventure Ndikung, my mother Doris Maninger, and all of the artists' works and the texts by writers, scholars, activists, journalists and poets featured in the show²³. Admittedly, I struggled here to find a narrative of my own, as the influence of their informed researches and perspectives have strongly blurred my own *vision*, one that began a long time ago when I firstly consciously experienced the toxic, namely in the waters of the little southern Italian village where I grew up, in Calabria. A story of toxicity that, just like the many presented and narrated within the limits of this project, is entangled with the pitfalls of European and transnational legislations, the alliance between organized crime, state corruption,

²² Audre Lorde, (1977), 'Poetry Is Not a Luxury', first published in 'Chrysalis: A Magazine of Female Culture', read in 'Your Silence Will Not Protect You"', (2018), Silver Press, pp. 10-11

²³ In the exhibition, in addition to artworks, on layers of orange paint – reminiscent of a highly toxic orpiment used as orange pigment from antiquity up to the 19th Century – appear historical facts, proverbs, varied literary stories, and scholarly texts predominantly but not exclusively related to toxic tales in Belgium. Together with the artworks, they shed light on how the toxic is experienced, understood and treated, both personally, and in communities.

fraudulent corporate politics, and the by-products of unsustainable lifestyles and cultural habits²⁴.

The will to curate an exhibition and to present research within the walls of a space has to do with recognizing that in order to understand and engage with the complex and contradictory nature of the toxic there is a need for a transdisciplinary approach to it, one that can engage all of our senses and make us *feel* its presence, and not only think about it. What 'Deadly Affairs' aims to do is to dissect how the unequal distribution of environmental catastrophes is inherently intertwined with issues of capitalism, imperialism and race. We use the tropes of toxic trades and toxic destruction to untangle the conditions that make its violence possible, and legally, socially and culturally acceptable. The notion of the toxic is understood as both the poisonous substances introduced into the environment, and as the violent and destructive processes and conditions of extraction, production and disposal made possible thanks to the structural inequalities and the segregation defining the world in which we live. For this reason, we particularly focus on those malevolent processes of *exchange* that are possible precisely because of the uneven conditions that determine them in the first place. We emphasize how behind the acceptance by local populations of many hazardous and very toxic industrial endeavours lies the promise of solving unemployment and poverty. In the exhibition this is addressed by Valentino Bellini in collaboration with Eileen Quinn, in a work merging investigative journalism, archival materials, interviews and photographs all related to the disastrous history of the petrochemical area of Siracusa in Sicily, and what remains of it in the environment, in people's bodies – from cancers to malformations – and in their memories. Or in the video by

²⁴ It has to do with the illegal dumping of ships containing toxic waste on the coasts of the village. For more information on the story read for instance <https://www.greenpeace.org/archive-italy/Global/italy/report/2010/inquinamento/Report-The-toxic-ship.pdf>

filmmaker Hira Nabi that, by zooming into the experience of the workers of the ship wrecking site in Gadani (Pakistan), highlights how the toxic by-products of industrial production do not just disappear. Instead, someone, somewhere, very probably with few alternatives, will dismantle and dump them, incurring contamination in the process. One then wonders how this is possible on a legal level, and whether there are any transnational regulations that try to control, monitor and manage such outrageous activities. Simone Müller and Zeynep Kubat look into the legal and cultural history of such multilateral agreements, and how they are continuously circumvented. They do this by pausing on some key moments such as the Basel Convention (1989), the transformation of certain definitions, such as from waste to recycling; and by unravelling complex case studies such as that of nuclear energy in Belgium. Jessika Khazrik looks into the legal tactics put in place to hide toxic waste trades through the collaboration between criminal organizations (such as the Italian Mafia) and corrupted states (in this case the Lebanese Forces). Neda Saeedi then builds a direct connection between the *civilizing* force of Western ideology and its effects on different types of lands, and life practices, particularly during the White Revolution in Iran. The toxic dependencies produced by the same ideology are addressed by Boris Anje, who looks into the relations between individuals and brands. At the core of these dependencies sits the excessive and blind consumerism of a small minority of the world's population, characterized by a *throw it away and buy new one* attitude with catastrophic consequences for the environment and living conditions of the majority of our planet's inhabitants. Daniel Lambo and Franziska Pierwoss look into the asbestos industry, its deadly

politics, and its endemic presence. In particular, they analyze conditions that facilitate its migration from Europe towards the Global South, and the threats that company workers and consumers alike have been consciously subjected to.

The architecture of the exhibition, meant as both a sculptural intervention and a support structure, was conceived and designed by artist and architect Adrien Tirtiaux. It centres around a cement wall that cuts through the space, revealing the problem of visibility at the core of the toxic, and particularly the divide between what is seen and what is not, and what lies behind the surface of things. It also represents a divide between who or what is deemed valuable enough to be kept at a relatively safe distance from the toxic, and who or what is instead forced to live in close proximity to it. This divide is real, but also illusory, as everything takes place within a set of entangled relations (in both space and time) and because toxic dissemination is ultimately impossible to contain, as the text by Caroline Ektander further elaborates. Similarly, but through a completely different form, we present a film by Susan Schuppli, which speaks to the entangled nature of our spatial relations, particularly exemplified by exploring the geological, meteorological and hydrological appearance of nuclear evidence within matter.

In an effort to think about different futures, about visions freed from pessimism, Simone Müller, Jonas Stuck, Ayushi Dhawan and Maximilian Fechtner have started a series of writings under the umbrella title of “Hazardous Hope”²⁵, a selection of which we have republished here. Jonas Stuck looks into different case studies relating to a new bacterium capable of breaking down PET plastic. Maximilian Fechtner

looks into practices of bioremediation as a solution to the extensive environmental contamination in Ecuador. Ayushi Dhawan writes about a case of Dutch shippers sentenced for having contaminated ships that were later demolished on an Indian beach. Also artists, with their capacity of imagining the world otherwise, find ways to react to catastrophic events, even if not through direct solutions in scientific or legal terms. For example, the collective Don’t Follow the Wind present a fragment of their ongoing exhibition inside the restricted Fukushima exclusion zone, creating a symbolic space of hope between the area and the residents who have been separated from their homes, land, and community. A sensual visual poetry about life and death is presented by Various Artists, emphasizing the pleasure and desire that characterize much of the toxic, one that flirts with the tense relationship between humans and nature, mortality and immortality. Here is a world where resources needed for human life are depleted, and whether humans will survive is uncertain. The image the artist creates encourages an act of decentering, where the parameters to define good and bad, beauty and beast, and essentially how we live, are not determined by humans alone. Moving away from the anthropocentric conception of the world that capitalism has brought about might be regarded as a possibly more grounded way of living in this world, where earthlings not only care for their own species or community. We advocate for a form of more profound collective care that I believe can be encouraged by feeling before thinking, and by understanding through feeling. To conclude with the same reference with which I began: *“The Black mother within each of us – the poet – whispers in our dreams: I feel –*

²⁵ You can follow their blog entries here: https://www.hazardoustravels.carson-center.unimuenchen.de/blog_trash-talks_/hazardous_hope/index.html

*therefore I can be free*²⁶. Those dreams have to be nurtured, and poetry and art, as Lorde suggests, can chart the revolutionary demand of such dreams. “*Our children cannot dream unless they live, they cannot live unless they are nourished, and who else will feed them the real food without which their dreams will be no different from ours? ‘If you want us to change the world someday, we at least have to live long enough to grow up!’ shouts the child*”²⁷.

²⁶ Audre Lorde
p. 9

²⁷ Audre Lorde
p. 10



Valentino Bellini and Eileen Quinn, 'This is how we walked on the moon', (2018-2019), courtesy of the artists.

HAZARDOUS TRAVELS: GHOST ACRES AND THE GLOBAL WASTE ECONOMY

Dr. Simone M. Müller

HOW RACHEL CARSON BROUGHT DEATH TO EGYPT'S WATER BUFFALOES

Over the course of 1971, Egypt was struck by an epidemic of paralysis in water buffalos. The animals first developed paralysis in their hindquarters. Then they showed difficulty in breathing and trembling in the forelimbs. Over time, they could no longer urinate or defecate. After roughly two months of suffering, the animals had to be put down or died. Approximately 1,200 to 1,300 water buffaloes succumbed to this strange epidemic and many a family fortune vanished with the animals.¹ At the time, water buffaloes represented one of, if not the most important farm animal in Egypt. Farmers used them for ploughing and other forms of labour as well as a source of meat, leather and milk. Epidemiological investigations in 1971 and 1973, after a second smaller case of the same strange epidemic, led to the suspicion that a new pesticide used on cotton had caused the death of the water buffaloes.² Supported from a financial loan from U.S. AID, Egypt had bought the pesticide leptophos from a company in the United States that had sought foreign markets for a product unsalable in the United States. Now it seemed to be the cause for the death of Egyptian water buffaloes.³

¹ Richard H. Adams, (1986,) 'Development and Social Change in Rural Egypt', Syracuse: Syracuse University Press, pp 62.

² Leptophos Advisory Committee, (1976), 'The Report of the Leptophos Advisory Committee to the Administrator United States Environmental Protection Agency', Washington D.C., pp 43-44.

³ David Kinkela, (2013), 'The Paradox of US Pesticide Policy During the Age of Ecology', in 'Nation-States and the Global Environment: New Approaches to International Environmental History', ed. E. M. Bsumek, D. Kinkela and M. A. Lawrence, pp 115-34. Oxford University Press, pp 175; The company Velsicol only had a per-

"We are not responsible"

mit to export Leptophos. It did not have a registration for the U.S. market. Environmental Protection Agency, (1976), Leptophos Advisory Committee Meeting: Public Session, Washington D.C.: U.S. Government Printing Office, pp 68.

⁴ Rachel Carson, (1962), 'Silent Spring', (Fawcett: Greenwich/Conn., 1964) first published in the New Yorker; In the literature, Rachel Carson's Silent Spring is often accredited to have catalyzed the rise of environmentalism in the United States. Most recent scholarship challenges this widely held belief recognizing a long line of overlooked historical actors and other important factors behind the rise of modern

Throughout the 1960s and 1970s, the United States had seen tremendous changes in their consumer health and environmental protection legislation. Through her 1962 publication "Silent Spring", scientist and writer, Rachel Carson, had alerted her readers to the overuse and misuse of chemical pesticides and herbicides with well-told tales of invisible chemical poisons pervading the world and contaminating food.⁴ The book brought to public attention concerns over chlorinated hydrocarbons (such as DDT, Aldrin, dieldrin, and chlordane), organophosphates (such as parathion, malathion, or leptophos), and other chemicals. Farmers, among others, had used these substances in the post-World War II decades to control mosquitoes, lice, and insect pests on crops, understanding little about the substances' side effects on human health and the ecosystem. Rachel Carson's Silent Spring pointed out to the public how organophosphates bioaccumulated in the environment and biomagnified in organic systems, until reaching toxic levels in top predators such as the bald eagles, and how exposure to organophosphates, a potent nerve gas, resulted in cholinesterase inhibition by disrupting the normal working of an enzyme critical to normal nerve function.⁵ The book fundamentally uprooted U.S. society in its relationship to pesticides and other synthetic chemicals.⁶

Ironically, the book indirectly also established the link between the environments of Egypt and the United States. In the wake of Rachel Carson's publication "Silent Spring", U.S. environmental and consumer health institutions, the EPA and the Consumer Product Safety Commission, started to ban or suspend a series of synthetic chemicals for national use. Among them were the infamous pesticide DDT, but

also less well-known substances such as Kepone or Leptophos.⁷ In 1975, the EPA ordered the suspension of the sale of two agricultural pesticides, chlordane and heptachlor, that had been widely used in certain farm crops, including corn and tobacco.⁸ Similarly to the EPA, the Consumer Product Safety Commission added more and more substances, such as the chemical flame retardant TRIS, to its list of banned substances to use in consumer products. Over the course of the 1970s, the list grew longer and longer.⁹

U.S. consumer health and environmental protection came with a hazardous twist, however. Little did the U.S. agencies realize at the time, that their bans also created a host of serious problems far extending beyond consumer health and environmental protection. Stored in massive amounts all over the United States, at farms, town shops, and within the premises of the U.S. chemical businesses, synthetic chemicals such as DDT, Aldrin, Dieldrin, but also a full range of consumer products, such as TRIS treated children sleepwear were no longer legal to sell or use. The EPA and the Consumer Product Safety Commission had turned a large number of chemicals, drugs, pesticides, and consumer products technically speaking, into hazardous waste. At the same time, legislation did not allow them to put a stop to the production of these chemicals, let alone ban their export abroad. As an immediate result, Leptophos, instead of being disposed of as hazardous waste in the United States, resurfaced in Egypt where less strict laws were in place and where the pesticide was legal. Meaning to protect U.S. consumers and environment, the agencies were complicit in creating an unequal system of global hazard distribution.¹⁰

environmental thinking and protest. Montrie, Chad (2018), 'The myth of silent spring: Rethinking the origins of American environmentalism', Oakland, California: University of California Press.

⁵ Frederick R. Davis, (2014), 'Banned: A history of pesticides and the science of toxicology'. New Haven: Yale University Press, pp 187.

⁶ Carolyn Merchant, (2007), 'American Environmental History: An Introduction', New York: Columbia University Press, pp 194.

⁷ Environmental Protection Agency, (December 31, 1972), 'DDT Ban Takes Effect: EPA Press Release', news release.; Davis, Banned.

⁸ Ingo Walter, (1982), 'Eco-

conomic Repercussion of Environmental Policy', in 'Environment and trade: The relation of international trade and environmental policy' (1982), ed. Seymour J. Rubin and Thomas R. Graham, 22-45. Totowa, NJ: Allanheld Osmun, pp 36.

⁹ Frederick R. Davis, (2014), 'Banned: A history of pesticides and the science of toxicology', New Haven: Yale University Press; On TRIS see also Committee on Energy and Commerce, (1981), 'Regulation of TRIS-treated sleepwear: Hearings before the Subcommittee on Oversight and Investigations 1981', Washington D.C.: U.S. Government Printing Office; Ninety-Seventh Congress, First Session.

¹⁰ Sociologist Stephen

THE MANY FACES OF "HAZARDOUS TRAVELS"

The story of Egypt's water buffaloes is one of the many faces of *hazardous travels*.¹¹ It is the first episode in the history of the global waste economy and the commodification of toxic waste material within a global system of externalization and material mutability that commenced in the 1970s. As industrial nations strove towards greener and healthier environments, they unwittingly and yet acceptingly pushed their hazards outwards. It is the paradox of modern environmentalism that it created a world of global environmental inequity. To this day, the same materiality is not hazardous waste everywhere around this planet at the same time.¹² Hardly a material does invite so many different perspectives and practices as that which we commonly call *toxic*. Hardly a material is subject to so many territorial understandings of what it takes to protect a country's citizens' health and environment and at the same time so oblivious to the political and scientific borders we erect and create.

The international trade with hazardous substances, to employ a broad term for a global trading network that moves globally items ranging from hazardous waste to banned pesticides and non-marketed consumer products, has received considerable attention from environmental, health and human rights activists, investigative journalists, administrators, and policy makers throughout the 1970s, 1980s, and up to the mid-1990s. Initially, the focus lay on the international marketing of restricted or banned pesticides, such as Kepone, DDT, or Leptophos or suspended consumer products, such as TRIS-treated children's sleepwear. Stories were driven forward by high-profile US media actors, such as PBS or the

Center for Investigative Reporting publishing award-winning material.¹³ Over the course of the 1980s, practices fabricating the global waste economy shifted from out-dated pesticides and suspended consumer products to actual waste coming from disposal sites.¹⁴

Hazardous Travels took on another face, when the ghost ships appeared.¹⁵ As of the late 1980s, in particular, a fleet of hazardous waste barges, such as the infamous Khian Sea, the Bark, the Karen B., or the Mobro, roamed the world's oceans in search for a dumping ground for their cargo. Ships and trucks moved hazardous waste from the United States to Haiti, Panama, the Bahamas, or Guinea, from Italy to Nigeria, from West Germany to East Germany, Turkey, or Rumania.¹⁶ Given the differences in waste regimes – a true cacophony of irreconcilable thresholds, definitions, and visions of health, purity, and safety – the material transformed once it crossed the border. From incinerator ash to fertilizer. From hazardous waste to brick building material. From waste to recycling. From highly guarded toxic material to anonymous barrels of unknown substances. Often, the ships were turned away, however. The sentiment spread particularly among African nations that they would not accept the role as the world's garbage dump. They took up the fight against what they perceived as garbage imperialism, a re-colonization of the world through trash, or simply U.S. (and other nations') toxic terrorism.¹⁷

In the late 1980s and early 1990s, Greenpeace ran a big international campaign against the trade with hazardous waste that was crucial for the "Basel Convention on the Transboundary Movement on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal", a 1989 UN treaty that

Lessenich describes the broader phenomenon as the externalization society 'Die Externalisierungsgesellschaft. Ein Internalisierungsversuch' (2015), *Soziologie* 44, pp 1-12.

¹¹ 'Hazardous Travels' is a research group at the Rachel Carson Center for Environment and Society funded by the German Research Foundation investigating the dynamics and structures of the global waste economy since the late twentieth century. <https://www.hazardoustravels.carsoncenter.uni-muenchen.de/index.html>, accessed March 5, 2019.

¹² Simone M. Müller, (2016), 'Cut Holes and Sink 'em': Chemical Weapons Disposal and Cold War History as a History of Risk', in 'Historical Social

Research 41', no. 1, pp 263-284; J. Daven and R. Klein, (2008), 'Progress in Waste Management Research', New York, pp 95.

¹³ David Weir and Mark Schapiro, (1981), 'Circle of Poison: Pesticides and People in a Hungry World' (Oakland, Calif.); Ruth Norris et al., eds., (1982), 'Pills, Pesticides & Profits', Croton-on-Hudson, N.Y.; Jane H. Ives, ed., (1985) 'The Export of Hazard: Transnational Corporations and Environmental Control Issues', Boston.

¹⁴ Bill D. Moyers, (1990), 'Global Dumping Ground: The International Traffic in Hazardous Waste', Washington; Jennifer Clapp, (2010), 'Toxic Exports: The Transfer of Hazardous Wastes and Technologies from Rich to

entered into force in 1992. Public, activist, and policy attention faded after the negotiations of the "Bamako Convention on the Ban of the Import into Africa and the Control of the Transboundary Movement of Hazardous Wastes within Africa" by the Organization of African Unity in 1991, which entered into force in 1998.¹⁸ Discussion resurfaced in the 2000s with a new focus on e-waste and recycling. It received another considerable push after China's most recent ban on plastic imports from abroad starting January 2018.¹⁹

Hazardous Travels, finally, is more than just the movement of what one party in the transaction might consider waste. Alongside actual trade in toxic material, industrial countries relocated their hazardous waste by *re-labeling* it according to different national standards as a resource fit for recycling. Starting in the 1970s, coastal regions in China, Taiwan, and South Korea, and then in India and Bangladesh, became the world's largest shipbreaking yards.

At Alang, in Gujarat, India, for instance, the ships' body parts, often containing toxins such as PCBs or Asbestos, are reintroduced into the local economy.²⁰

The amount of light dead tonnage in scrap metal makes up over 10 percent of scrap for India's emerging economy. Moreover, almost everything from the ship's steel to the fixtures and furniture, to pieces of sanitary ware or kitchen utensils, ended up in local markets.²¹ Finally, multinational companies, like the U.S.-based company Texaco, made millions by relocating dirty technologies not complying with OECD standards to non-OECD production sites. At their oil-production site in Lago Agrio in the Ecuadorian Amazon, Texaco left roughly 1,700 square miles of rainforest said by environmentalists to be one of the world's most contaminated industrial sites. Since

1993 30,000 Amazonian settlers and indigenous people, the Huaorani, who call themselves Los Afectados – the Affected Ones fight for clean-up and compensation.²²

Hazardous Travels has many faces and you can find episodes of its stories all over the globe.

Hazardous Travels is the story of the global waste economy as a system of global externalization mechanisms through which one country dumps that which it calls toxic, that which it deems unwanted on another country. These externalization mechanisms are integral part to an economic system that sustains its growth through the appropriation of cheap waste *land* – or *ghost acres* as we call these lands in our research group – all around the world.²³ In the end, *Hazardous Travels* creates a global geography of unequal valuations of environments and life.

BEARING WITNESS TO A WORLD OF EPISTEMIC CONTRADICTIONS

Travelling with the hazards, if only with a finger on a map, buried with one's nose in books and articles, or pulled in through the visuals of (moving) images from far-away lands, is challenging – both systemically as well as personally. *Hazardous Travels* lives in the shadows and equally plays according to the rules of *out of sight* – *out of mind* or *NIMBY* (not in my backyard), both standard attitudes in humanity's dealing with what we consider waste. The system banks on the invisible – also because we are complicit.

Usually, scholars, journalists, or artists investigating the international trade with hazardous waste encounter several dead-ends. Potentially always on

Poor Countries', Ithaca, N.Y. ; Dr. Kofi Asante-Duah and Imre V. Nagy, (1998), 'International Trade in Hazardous Wastes', Abingdon; Christoph Hilz, (1992), 'An Investigation of the International Toxic Waste Trade', New York, N.Y.

¹⁵ Simone M. Müller, (2016), 'The Flying Dutchmen: Ships Tales of Toxic Waste in a Globalized World', in 'RCC Perspectives 1', pp 13-19.

¹⁶ For a full list of waste trade schemes consult Vallette, Jim, and Heather Spalding, (1990), 'The International Trade in Wastes: A Greenpeace Inventory', Washington D.C.: Greenpeace USA.

¹⁷ The term garbage imperialism is mentioned in William Tuohy, (March 23, 1989), '116

Nations Adopt Treaty on Toxic Waste', in Los Angeles Times. The term toxic terrorism is coined by congressional representative John Conyers during a subcommittee meeting of the U.S. Congress on the International Trade with U.S. Hazardous Waste, Washington D.C., July 14, 1988, 6.

¹⁸ Katharina Kummer, (1995), 'International Management of Hazardous Wastes: The Basel Convention and Related Legal Rules', Oxford, New York; Jonathan Krueger, (1999), 'International Trade and the Basel Convention' London; Alan Andrews, (2009), 'Beyond the Ban: Can the Basel Convention adequately Safeguard the Interests of the World's

the verge of illegality, hazardous waste dealers avoid opening their archives – if some of the small-scale trading businesses kept one at all. In addition to such oafishness from traders, trade data is also difficult to compile otherwise. For the pre-Basel era, data on the amount of U.S. hazardous waste produced let alone traded, for instance, was lacking or inadequate. For much of what was traded, contemporaries, ranging from industry, the EPA, and the Department of Justice to members of US Congress and administrators, struggled whether to classify and regulate it as hazardous waste or hazardous substance.²⁴ The EPA and the U.S. General Accounting Office each provide numbers of hazardous waste produced in the United States that differ by 150 million tons.²⁵ Similarly, the EPA did not start record keeping on U.S. exports of hazardous waste prior to 1986; and unfortunately, they state, they do not keep those records longer than five years.²⁶

It is when traders, such as the Colbert brothers, are brought to trial or when a waste shipment gets into the focus of activists, court proceedings, media reports, EPA investigations, and NGO documents bring to light what otherwise remains hidden. The Greenpeace archive in Amsterdam, for instance, hosts a multitude of material that only waits for us to uncover its meaning – or at least acknowledge its existence. Environmental journalism, witness' interviews, and activists' whistle blowing is also key for scraping beneath the surface of macro analyses as are more unusual avenues of inquiry, such as leaked material or private photo collections on the web. When we turn to our own body, finally, we might also find traces of the hazard's global travel.

In the end, each of the items that those searching painstakingly uncover tells us its own narrative. It

is imperative that we listen to all of them. Narratives are important elements to order reality and they unfold the potential to frame the way members of an organization or citizens of a nation see the world.²⁷ In the case of the global waste economy, the existing narratives create a system full of epistemic contradictions. In 1991, for instance, world bank vice president Lawrence Summers became infamous when he suggested the World Bank support the movement of dirty industries to Africa, since the continent was “*vastly under-polluted*”. He violently clashed with those taking his views as the extreme economization of life. At the same time, the controversy suppressed that Summers' proposal was legal given the territorial legislation of labour, environment, and health. Waste – whatever it may be – was and is still not conceptualized on a planetary scale.²⁸

We find these epistemic contradictions not only within the system of the global waste economy, but – if we listen closely – also within us. For the convenience of our modern, western lifestyle, as well as our health and environmental protection, we choose to close ears and eyes on all the ties that we have with people and environments beyond our borders. Every time we fly, every time we buy a new electronic gadget and discard the old one, we are making those connections. We cannot untie the knot, but we can choose the kind of quality these connections have. In 1988, the U.S. Congress discussed the issue of the waste barges, such as the Khian Sea. Bugged by the legal limitations of U.S. hazardous export policy, congressional representative John Conyers cried out: “We know that you don't have the power to stop a transaction, but for goodness sake, we are all on the same planet.”²⁹

Poor in the International Trade of Hazardous Waste?', in 'Law, Environment and Development Journal' 5, no. 2.

¹⁹ L. Bisschop, (2016), 'Governance of the Illegal Trade in E-Waste and Tropical Timber: Case Studies on Transnational Environmental Crime', London/ New York; M. Kojima and E. Michida, (2013), 'International Trade in Recyclable and Hazardous Waste in Asia', Cheltenham; John Reed and Lesli Hook, (2018), 'The Global Recycling Crisis: Why the World's Recycling System Stopped Working', Financial Times.

²⁰ Puthucherril, (2010), 'From Shipbreaking

to Sustainable Ship Recycling’, pp 11; Kanthak and Bernstorff, (1999), ‘Ships for Scrap. Steel and Toxic Wastes for Asia’, pp 5.

²¹ Julie McElroy-Brown, (2006), ‘Shipbreaking at Alang, India’, in ‘Library Research Award for Undergraduate Submission, University of Washington’, pp 15; Frederico Demaria, (2010), ‘Shipbreaking at Alang-Sosiya (India)’, in ‘Ecological Economics’, pp 1-11; Annegret Ebner, (2005) ‘Knotenpunkt der Globalisierung’, Hamburg.

²² Kimerling, (2012), ‘Remarks by Judith Kimerling’, in ‘Proceedings of the Annual meeting American Society of International Law’, pp 416-419, 417; Allen Gerlach, (2003), ‘Indians, Oil, and Politics’, Wilmington, Delaware.

²³ On the concept of ghost acres see Georg Borgström, (1965), ‘The hungry planet. The modern world at the edge of famine’, New York/ London, Chapter 5; Kenneth Pomeranz, (2000), ‘The great divergence. China, Europe, and the making of the modern world economy’, Princeton.

²⁴ Jacob S. Scherr, (1987), ‘Hazardous Exports: U.S. and International Policy Developments’, in ‘Multinational Corporations, Environment, and the Third World’, ed. Charles S. Pearson, Durham, pp 129-148.

²⁵ Joshua Karliner, (undated), ‘Backyard Dumping: Toxic Waste Export to the Third World’, Delaware Valley Toxic Coalition Records (Environmental Project on Central America, Temple University Urban Archive).

²⁶ EPA Letter to the author, (August 8 2018), ‘Freedom of Information Act Request EPA-HQ-2018-009879’.

²⁷ Per H. Hansen, (2012), ‘Business History: A Cultural and Narrative Approach’, in The Business History Review 86, pp 693-717.

²⁸ Simone M. Müller, (2016), ‘Rettet die Erde vor den Ökonomen’, in ‘Archiv für Sozialgeschichte 56: Sozialgeschichte des Kapitalismus’, pp 353-71.

²⁹ John Conyers to EPA representative Sheldon Meyers, House Government Operations environment, energy, and natural resources subcommittee, Washington D.C. July 14, 1988.

“The history of risk distribution shows that, like wealth, risks adhere to the class pattern, only inversely: wealth accumulates at the top, risks at the bottom.”

Beck, Ulrich, (1992), ‘The Risk Society: Towards a new modernity’, Sage Publishing

DISRUPTING TOXIC IMAGINARIES – IN ORDER TO FIND SPACE TO ACT

Caroline Ektander

“Really thinking spatially means looking out beyond ourselves; a recognition of others.”
Doreen Massey¹

(I)

Everyone is born somewhere, and that somewhere undeniably shapes us. Whether we find ourselves in a European capital or at the fringe of an Asian metropolis, our geography is not simply a dead background or a neutral stage we occupy, but rather, each individual point in space is filled with both material and imagined forces that can hurt or help us in nearly everything we do². The fact then that humans are presently emitting more than 250 billion tons of chemical substances a year, and that the Earth, and all life on it, is being saturated in an event unlike anything in the planet’s entire history³, helps to exemplify just how much our place on earth influences us. Because seen on a global scale, the distribution of all these toxins is strikingly inequitable. Meaning, that while some manage to remain relatively unaware and untouched by this alarming development, others live in deadly exposure on a daily basis.

¹ Doreen Massey, (2002), ‘Globalization: what does it mean for geography’, *Geography* 87:4, pp 293-296

² Edward Soja, (2010), ‘Seeking Spatial Justice’, University of Minnesota Press, Minneapolis, p.19

³ Julian Cribb, (2017), ‘Surviving the 21st Century: Humanities 10 challenges and how we can overcome them’, Springer International Publishing, Switzerland

It has also not escaped the attention of many that the direction in which the world is currently evolving produces highly uneven geographies. One can simply contrast the impeccably clean streets of inner-city Stockholm with the slums on the fringe of Mumbai to see how differences in both lived reality and future outlook could not be more pronounced. This disparity is unfortunately no longer limited to the relative proximity to basic resources or functioning infrastructure, but now also includes direct, and even lethal, health impacts on those in close proximity to toxic sources – be it through where they live, the work they do or what they eat and drink. And along with this comes also all the uncalculated and unimaginable environmental risks and hazards implicit in the unruly movement of toxic substances through soil, water and air, and the slow violence⁴ that they leave in their wake. This is essentially because toxic destruction is neither spectacular nor instantaneous, but rather insidious, incremental, and with repercussions that can take years, decades, or even centuries, to appear.

But despite the recognition that a particular set of conditions is creating such an unjust pattern of development globally, it is nevertheless difficult to imagine alternatives. Wealth continues to incrementally detach from the environmental injustice inherent to its patchy, yet incisive spread⁵, making it increasingly hard to escape the logic that the wealthy will continue to get wealthier, and the rest will continue to absorb the unprecedented costs for this progress.

⁴ Rob Nixon, (2011), 'Slow Violence and the Environmentalism of the Poor', Harvard University Press, London

⁵ Jason W. Moore, (2016), 'The Rise of Cheap Nature', The Open Repository, Birmingham

(II)

One source of this uneven geographical development can be traced back to social inequality on a global scale, which has produced a market of exchange that enables the global North to *externalize* dirty processes of extraction, production and disposal to the global South at the cost of uncalculated environmental risks and public health hazards for the production sites⁶. In advanced modernity the social production of wealth is systematically accompanied by the social production of risks and "*the history of risk distribution shows us [that risk] is like wealth*" in that it "*adhere[s] to the class pattern, only inversely: wealth accumulates at the top, risks at the bottom*"⁷. The making of privileges for certain humans within the modern, and particularly Western project, thus simultaneously manufactures risks for others, primarily through the aforementioned "externalization mechanism".

Ultimately, there is always a risk offset in providing growth at all costs; buying the cheapest products usually entails dirty extraction and exploitative production processes somewhere else. The risk implicit to the abundance of energy is the unsafe disposal of nuclear waste, just as the steady saturation of pharmaceuticals, chemicals and plastics in the water and soils are now complicit in many global industrial health and food safety crises.

And as supply chains and production lines are steadily stretched across the globe in search of new frontiers⁸, the manufactured risks and uncertainties⁹ are effectively detached from their source, producing

⁶ Stephan Lessenich, (2015), 'Die Externalisierungsgesellschaft: Ein Internalisierungsversuch', *Soziologie* 44:1, pp 1-12

⁷ Ulrich Beck, (1992), 'Risk Society: Towards a New Modernity', Sage Publication, London, p. 35

⁸ Elizabeth A. Povinelli, (2018), 'Horizons and Frontiers, Late Liberal Territoriality, and Toxic Habits', *eFlux Journal* #90

⁹ Ulrich Beck, (2009), 'World Risk Society and Manufactured Uncertainties', *European Journal of Philosophy and Public Debate*, pp 291-299

weak relational ties that obscure the awareness that certain privileges and lifestyles have real palpable consequences – because what is out of sight is also out of mind.

One can exemplify this easily in a split-frame between inner city London and a recycling plant on the outskirts of Accra. In the former, smartphones are exchanged for the newest model yearly, if not biannually, almost as if by necessity. Simultaneously, young men in the latter “choose” to inhale toxic fumes whilst smelting the same phones in order to extract a few precious metals, including gold and palladium, from the circuit boards. The vast majority of the materials is left to burn however; releasing chloride, mercury and other vapors into the atmosphere¹⁰. The material circumstances of the two contexts could not be further apart, yet they are so deeply and profoundly intertwined.

If we return to the opening preposition that the immediate environment has a formative role on one's life and livelihood, then one could argue that just as toxic exposure determines certain futures, the lack thereof has equally habituating effects. Normative behavior is secured and unchallenged because the negative impacts of a privileged lifestyle are not immediately discernible to those removed from toxic work and waste sites. The field of material culture contends that our environment habituates and prompts us, particularly in relation to that which fades out of focus but continues to determine our behavior. This renders our immediate environment of utmost importance, not because it physically constrains or enables us, but often precisely because we do not really “see” it¹¹.

Along this line of reasoning, one can argue that not only do our thoughts shape our built environment, but the built environment in turn is also always shaping us back.¹²

From these mutually inclusive relations, highly situated and differentiated geographies take shape. In one corner of the world a city neighborhood slowly materializes comprised of retail space, coffee bars, and real estate showrooms, neatly arranged along avenues, parking lots, and flawlessly landscaped parks. Simultaneously, in another corner of the world, land-masses are forcibly cleared for extraction or disposal, and next to the worksite an informal settlement emerges filled with despondent workers ready to take any job available. It is from this dialectical movement, between the imagined and the built, that the worlding of worlds¹³ is swayed into motion, leaving ever deeper traces on the Earth's surface.

(III)

So how is it, then, that a (political) project proven to have such substantial costs and detrimental effects can still be up and running? A very fundamental explanation for this is the powerful spatial imaginary of horizons and frontiers¹⁴ that has emanated from Europe since the first explorer ship set sail in the middle of the fifteenth century. This conceptualization of space as a dead flat surface helps support a linear narrative of conquest and endless growth, and has hitherto obliterated the other plausible futures that it met on its journey. Many are painfully aware of all the examples mentioned above, yet the logic in-

¹² Edward Soja, (1980), 'The socio-spatial dialects', *Annals of the Association of American Geographers*, 70:2, pp 207-225. ¹³ Rolando Vazquez, (2017), 'Precedence, Earth and the Anthropocene: Decolonizing design', *Design Philosophy papers*, 15:1, pp 77-91.

¹³ In this text Vazquez makes a strong case that design has become modernity's way of creating or annihilating relations, both to the earth and to each other.

¹⁴ Elizabeth A. Povinelli

¹⁰ Peter Holgate, (2018), 'The model for recycling smart phones is actually causing massive pollution', *Recode*, extracted from: <https://www.recode.net/2017/11/8/16621512>

¹¹ Daniel Miller, (2005), 'Materiality: An introduction', *Duke University Press, USA*, p. 5

herent to the story of the Western world is so forceful that it gives little space to truly imagine an alternative – or what is so famously referred to as a “way-out”. Because the unjust relations that have evolved over exploitation have produced a market of exchange that maintains the movement of the toxic away from nexuses of power, to areas “outside” of its jurisdiction. And the most cynical aspect of this is that it has a logic that justifies it!¹⁵

In light of this reasoning, it is then hard not to consider how “geography” and “space” – or at least something intrinsic to how they are conceived or conceptualized – is not part of the solution.

(IV)

So, in order to not get overwhelmed by how deep inequalities cut through and frame our futures, I turn to Doreen Massey, and think with her. Her work invites me to open up to the idea that space has an ephemeral and abstract quality, and is not simply an empty container or a flat surface. For Massey, space is the “dimension of the social” where a multiplicity of stories and trajectories unfold relative to each other in what she refers to as “contemporaneous plurality” or “coexisting heterogeneity”¹⁶. This simple, yet potent, idea is an uplifting reminder that we are all living in the same moment, and *not* necessarily delimited by one big narrative of progress and growth.

To fully grasp Massey’s project for space and how it is pivotal to rewiring the toxic narrative of progress, and the human/environmental injustice that is so inextricably

cably tied to it, one must take a few steps back and locate her contribution within the canon of poststructuralist geographers who present a more progressive understanding of “place” in a globalized world. In her 1991 essay ‘A global sense of place’, Massey contends that “*instead of thinking of places as areas with boundaries around, they can be imagined as articulated moments in networks of social relations*”.¹⁷ This way of thinking allows for “*a sense of place which is extroverted, which includes a consciousness of its links with the wider world, which integrates in a positive way the global and the local.*”¹⁸ This conceptualization forcefully breaks the inside/outside rationale that so easily conceals the raw relational ties that weave together lives across the globe. Ultimately, cities and regions are caught up in multiple dynamics of spatial formation so that one must look critically at a location’s external influences in order to situate it within its wider context.

In her seminal work *For Space* Massey continues to ruminate on space. “*What is needed*”, she argues, “*is to uproot “space” from that constellation of concepts in which it has so unquestioningly so often been embedded (stasis; closure; representation), and to settle it among another set of ideas (heterogeneity; relationality; coevalness ... liveliness indeed) where it releases a more challenging political landscape*”.¹⁹ Because when space is seen as static and fixed, it annihilates all relational worlds and subsequently turns space into time and geography into history. And by denying the multiplicity of stories and trajectories, it reduces the future to one temporality with only one path forward. The dangerous effect this has is that it only makes room for one story, one history, so that

¹⁵ Rob Nixon, pp 1-2. With reference to the Lawrence Summer’s letter calling for a scheme to export rich nation garbage and toxic waste to Africa.

¹⁶ Doreen Massey, (2005), ‘For space’, Sage Publications, London, p. 9

¹⁷ Doreen Massey, (1991), ‘A global sense of place’, *Marxism Today*, pp 24-29

¹⁸ *ibid*

¹⁹ Doreen Massey, (2005), ‘For space’, p. 18

each and every person is simply at a different stage of it, or what Massey refers to as “a *place in the historical queue*”. And that historical queue is currently dictating the direction in which toxic materialities are flowing globally.

So if space is the product of interrelations, from the immensity of the global to the intimately tiny, then one must be genuinely engaged in thinking of space in constant motion and as an unfinished production at every imaginable geographical level. Essentially, space is made out of relations between peoples and things and each and every one of these relations are imbued with power. Which means that constantly challenging the geographical imagination is absolutely fundamental to how we live and to our politics, and how the worlding of worlds unfolds. Because what Massey’s project makes visible are the tensions between a responsible geographical imagination that is “processual” and an irresponsible one that is “fixed”.

If one then honestly plays out the proposition that the place one finds oneself is “*constructed out of a particular constellation of social relations, meeting and weaving together at a particular locus*”, and that these relations are “*real relations with real content – economic, political, cultural*” which connects the “*local place and the wider world in which it is set*.”²⁰ Then (toxic) relations both co-produce the immediate environment as well as shape the interactions with the larger biophysical world at large. Keeping this in mind compels us to imagine a “lived reality” in which our complex interconnectedness with our immediate surroundings includes not only our visible, tangible effect on them, but also our invisible, long-distance,

long-term effects on other humans, non-humans and, in the long run, the planet as a whole.

If I were to stretch this argument even a bit further, I would make a case for how political problems are made present through the making of the material world in the first place – which should perhaps push certain people of privilege to look twice at the lack of dirt, grime and waste around them, because they are also essentially formative to the global waste problem.

(V)

Toxic distribution globally hence becomes a powerful trope to think with. Its unruly and ubiquitous materiality and movement over time and geography help revitalize how important it is to reimagine and revalue space when trying to describe the incessant proliferation of toxic waste. But perhaps even more so in order to find ways to act against it. Because the essence of toxic movement demands a completely new political geography – one that always looks outwards and is open to the wider world. To truly embrace the profound understanding that space is a process of negotiating relations and power is thus a highly political project.

This brings about a conclusion of a sort: geographies produce us, and if they are unjust, then they produce the injustices that divide us. If we start making bad geographies, then those with power have the responsibility to change them. ‘Deadly Affairs’ can therefore be seen as an articulation – an attempt to open up a

²⁰ Doreen Massey, (1991), ‘A global sense of place’, pp 24-29

space of *somewhere else* – *here*. A decentering act, if you like, that realigns and gives space to toxic relations emanating out of one particular place in time, in order to help foster a shared social and political awareness of the global.

LET'S TALK ABOUT DEADLY AFFAIRS IN BELGIUM

Zeynep Kubat

“There are poisons that blind you, and poisons that
open your eyes”.

August Strindberg

In 2018, I was asked to conduct research on hazardous waste in Belgium and the intricate web of relations that make its production and disposal possible. These relations range from national and/or European laws on the definition of toxicity, to the local and national policies and politics of waste management, as well as transnational waste travel. I started my research process with a critical enquiry into the Basel Convention, an international treaty about the management and control of hazardous waste, which proved to have pitfalls that are extremely relevant to the matters at stake in this exhibition. I quickly realized three things: it was easy to find an overwhelming amount of information on waste management and toxicity; the lingo of the legal framework was not meant for the layman's eyes; certain institutions have the tendency to provide well-formulated, yet insufficient information on certain events, such as was the case with the information provided about the health hazards of the soil pollution in the streets surrounding Extra City.

From the start, the curatorial intention was to locate Kunsthall Extra City and its position in the social fabric of the city of Antwerp within this broader research framework. The history of the building in which the Kunsthall is located is very relevant to this exhibition,

¹ Federal Agency for Nuclear Control, (s.d.), 'Kerncentrales in België', <https://www.fanc.fgov.be/nl/informatie-dossiers/kerncentrales-belgie>. Accessed: 28 February 2019; Engie, (s.d.), 'Geschiedenis. Van 1905 tot vandaag', <http://corporate.engie-electrabel.be/nl/100-jaar-ervaring/>. Accessed: 28 February 2019.

² Federal Agency for Nuclear Control, (s.d.), 'Kerncentrales in België', <https://www.fanc.fgov.be/nl/informatie-dossiers/kerncentrales-belgie>. Accessed: 28 February 2019.

³ ENGIE, (s.d.), 'Kern-energie. Een onmisbare energiebron', <http://corporate.engie-electrabel.be/nl/lokaal-producent/kernenergie/>.

since the soil is heavily polluted by dry-cleaning activities from the former industrial laundry company Goossens. Liters of solvent, which they used for washing and drying textiles, seeped into the soil and reached the homes of people in the neighbourhood through the public sewage system and groundwater. From this particular story, I sought more examples close to home that had to do with harmful waste and the pollution of the environment. I encountered shockingly many cases through scholarly research, the work of investigative journalists, and from acquaintances. In order to keep things clear, we decided to focus on only three complex, yet important cases from Flanders, two of which are under discussion in the public sphere as I write: the asbestos industry in Belgium; the dire state of nuclear plants in Belgium; and soil pollution in the neighbourhood of Berchem.

In this text, I share one particular case study in which I synthesized the work of investigative journalists, engaging with the core aspects that currently define the national discussion on nuclear plants and energy in Belgium. This fragment exemplifies the complex web of interests that surrounds such cases.

NUCLEAR ENERGY IN BELGIUM: ON THE RUINS OF NONCHALANCE

The main energy company in Belgium is Electrabel, which is owned by the French company Engie.¹ In total, Belgium has seven nuclear plants, dispersed on several sites, of which the best known are Doel and Tihange.² Electrabel owns both sites.³ The Federal

Agency for Nuclear Control is responsible for the safe use and agency of these reactors.⁴ Still, there have been serious problems throughout the years, such as a leak in Tihange 1 (2006–2012 and probably longer, since the reactor was not closed for maintenance until last year)⁵, thousands of cracks in the cement walls of Doel 3 (discovered in 2012)⁶, a leak in Doel 1 in 2018⁷ and general concrete decay.⁸ On Tuesday the 5th of August in 2014, Doel 4 was sabotaged. We still have no clue about who sabotaged it, why and under which circumstances. The oil reservoir of the steam turbine was tapped open.⁹ This turbine takes the steam that is produced in the reactor and turns it into electricity.¹⁰ Without any traces, the oil within the tank had disappeared. Someone had installed a special circuit to let the oil flow out of the tank and into another container. In thirty-seven minutes' time, 65 000 liters of oil streamed out of the turbine.¹¹ Electrabel asked the federal prosecutor's service of Belgium to start an official investigation into this sabotage scheme. Finally, the FANC (Federal Agency for Nuclear Control) started an investigation as well. After almost five years of research, the people have received neither basic communication of the investigative results, nor a clear statement of what happened and who did it.¹²

Belgium does have organizations, monitoring boards and partnerships to assure safe production and waste management.¹³ International involvement is mainly based on agreements with the European Union, the United Nations, and the Nuclear Energy Agency of the OECD (Organization for Economic Cooperation and Development).¹⁴ In 2010, members of this agency organized an agreement between thirteen countries for the long-term management of radioac-

Accessed: 28 February 2019.

⁴ Federal Agency for Nuclear Control, (s.d.), 'Kerncentrales in België', <https://www.fanc.fgov.be/nl/informatie-dossiers/kerncentrales-belgie>. Accessed: 28 February 2019.

⁵ S.n., (12 July 2012), 'Kerncentrale Tihange lekt al zes jaar', De Standaard, http://www.standaard.be/cnt/dmf20120712_090. Accessed: February 2019; S.n., (13 October 2018), 'Tihange 1 stilgelegd voor onderhoud, België draait nu op één kerncentrale', De Standaard, <https://www.google.com/search?client=firefox-b-d&q=tihange+1+stilgelegd+voor+onderhoud>. Accessed: 28 February 2019.

⁶ Helenka Spanjer, (28 February

2015), ‘Doel 3 en Tihange 2: hoe onheilsPELLend zijn de scheurtjes?’ De Wereld Morgen, www.dewereldmorgen.be/artikel/2015/02/28/doel-3-en-tihange-2-hoe-onheilsPELLend-zijn-de-scheurtjes. Accessed: 28 February 2019.

⁷ Bart Kurstjens, (28 April 2018), ‘Kerncentrale Doel 1 stil na lek in nucleair gedeelte’, <https://www.tijd.be/ondernemen/milieu-energie/kerncentrale-doel-1-stil-na-lek-in-nucleair-gedeelte/10007105.html>. Accessed: 28 February 2019.

⁸ Bas Kurstjens, (19 September 2018), ‘Ook betonrot in kernreactoren Doel 4 en Tihange 2’, De Tijd, <https://www.tijd.be/ondernemen/milieu-energie/ook-betonrot-in-kernreac->

tive waste. According to the OECD, “*community representation may be assured through the participation of local interest groups, civil society organizations, authorities, scientific bodies, local politicians and/or neighbouring communities, amongst others.*”¹⁶ This agreement supported, for instance, the building and organization of the nuclear waste dismantling facilities at Dessel and Mol.¹⁷

Despite this policy-based framework for nuclear management and waste, public safety has been a precarious subject. Areas in the Netherlands and Germany that border Belgian nuclear plants, like Reusel-de Mierden, a region of Aachen, and the state of Rheinland-Pfalz, have complained for years about their discredited safety caused by our nuclear plants.¹⁸ They have been monitoring their nuclear safety and have provided iodine pills to their residents.¹⁹ In 2017-2018, the Flemish government handed out free iodine pills as well: one pack of 10 pills per citizen, only enough to protect a healthy adult against thyroid cancer for five days.²⁰ The media campaign felt as if they were handing out free candy instead of basic protection against radioactive threats. Many citizens have picked up their pills from their local drugstore, but there are still a lot of people who are not aware that this was neither a positive stunt, nor an open-ended story.

Belgium has a total surface area of 30.528 km², with circa 11 million citizens, average yearly total energy consumption between 80 and 85 TWh, and an average yearly consumption of about 7000 kW per capita.²¹ Let’s compare this with Germany: the total surface area of the country is 357.386 km², with circa

82-83 million citizens, whereas the energy consumption is about 6300 kW per capita.²² The explanation for this disproportionate number for our energy consumption is simple. There is a national lack of incentive for private individuals and businesses to invest in sustainable energy sources, and the government has been putting off their responsibility to implement new policy. The country is holding tight to its unsecured nuclear plants. For years there has been awareness of severe safety issues, but the policies to engage in direct action are lacking.²³ This is because of the charged public discourse on the subject between political parties, enforced by the typically short-term ecologic and economic thinking of our legislators, but also because of the financial implications, with Engie at the heart of this game.

It wasn’t until 2011, after the Fukushima nuclear disaster, that widespread protests and awareness added to the work of a small number of local activists, who had been following the case much longer.²⁴ In 2012, commotion arose around the choice of dismantling the power plants, while creating and investing in alternative (greener) energy sources.²⁵ In January 2012, the Nuclear Forum of Belgium (NF) also campaigned to inform people about nuclear energy by asking: “*Do power plants really emit CO2?*”²⁶ Jong SP.a and Jong Groen reacted with their own campaign: “*Is the Nuclear Forum also talking nonsense?*”²⁷ They had unmasked the NF as a pro-nuclear energy lobby group. The fact that nuclear plants do not emit massive amounts of CO2 is quite irrelevant in the context of the greater picture of public safety, waste management, and long-term solutions for sustainable living. The Nuclear Forum is an organization

toren-doel-4-en-tihange-2/10051020.html. Accessed: 28 February 2019.; Sara Van Dyck, (28 September 2018), ‘20 jaar betonrot in kerncentrales: milieuorganisaties vragen parlementair onderzoek’, Bond Beter Leefmilieu, <https://www.bondbeter-leefmilieu.be/artikel/20-jaar-betonrot-kerncentrales-milieuorganisaties-vragen-parlementair-onderzoek>. Accessed: 28 February 2019.

⁹ FANC, (s.d.), ‘Sabotage van de stroomturbine van Doel 4’, <https://fanc.fgov.be/nl/informatiedossiers/kerncentrales-belgie/actualiteit/sabotage-van-de-stroomturbine-van-doel-4>. Accessed: 28 February 2019.

¹⁰ Emis, (s.d.), ‘Gesloten pro-

cessen voor elektriciteit-sopwekking uit hernieuwbare brandstoffen', <https://emis.vito.be/nl/techniekfiche/gesloten-processen-voor-elektriciteitopwekking-uit-hernieuwbare-brandstoffen>. Accessed: 28 February 2019.

¹¹ Joris Truys, (4 August 2017), '3 jaar geleden werd Doel 4 gesaboteerd, van de dader is nog steeds geen spoor', VRT NWS, https://www.vrt.be/vrtnws/nl/2017/08/04/3_jaar_geleden_werddoel4gesaboteerd_vandedaderisnogsteedsgeen_spoor1-3039185/. Accessed: 28 February 2019.

¹² Lars Bové, (9 August 2018), 'Sabotage kerncentrale Doel is vier jaar later nog mysterie', De Tijd, [https://www.tijd.be/politiek-](https://www.tijd.be/politiek-economie/belgie/algemeen/sabotage-kerncentrale-doel-is-vier-jaar-later-nog-al-tijd-mysterie/10038413.html)

that is part of the European Atomic Forum (Foratom), a European mother organization for nuclear energy. They have acted as a network of several companies in the sector, such as: Electrabel, Agoria, SPE, the Study Center for Nuclear Energy, Westinghouse Electric Belgium, etc.²⁸ These are all companies creating means for nuclear energy production, management, nuclear waste management, transports and medical use of radioactive elements.²⁹ They have held several campaigns throughout the years, always ready to prove the positive impact of nuclear energy, and eager to prove the efficiency of our nuclear plant management. On their website, they have an entire thread about the negative impact of stepping out of nuclear energy, enforced by propaganda-like dossiers about global nuclear energy and positive language about the management of the aftermath of the Fukushima Daiichi nuclear disaster in 2011.³⁰

Still, sometimes there is an effort within a limited policy framework to optimize the situation, in other words, to create the best of worst scenarios. One such example is the national Energy Pact of Belgian Prime Minister Charles Michel, to be fulfilled by 2025.³¹ In 2017, Federal Minister for Housing, Quality of Life, Environment and Energy Céline Frémault's Cabinet stated that her party would not agree to this pact, unless Belgium would step out of nuclear energy for good.³² Her cabinet would represent the decision of the Brussels Capital District, which would block the creation, and finalization, of the pact. Despite Frémault's harsh voice in 2017, the Federal government reached an agreement in March 2018 that would facilitate a transition of energy sources and bring about Michel's Energy Pact in 2025. Now,

only the Flemish government has to make decisions too.³³ However, there are other issues at stake that endanger the execution of this Pact.

Before the summer of 2018, Charles Michel wanted to make sure that Engie and Electrabel would take up responsibility, as owners, for the dismantling of the nuclear plants.³⁴ Therefore, he approved a new proposition by Christine Marghem, Federal Minister of Energy, Environment and Sustainable Development, to give the Commission for Nuclear Provisions more power over the management of Synatom, a subsidiary company of Electrabel, which functions as a treasury.³⁵ According to journalists Christine Scharff and Wim Van Velden, Synatom was a piggy bank with 10,1 billion euros for the dismantling of the nuclear plants. In October 2018, Scharff and Van Velden wrote an investigative article for newspaper "De Tijd" and unveiled that Electrabel managed this piggy bank before Michel signed the proposition of Marghem and used it as a free credit system to finance its own projects.³⁶ Engie did not like this, and decided to strike a deal with the government. This deal stated that Engie should act as a guarantor until the dismantling is over, and, in return, the company would receive a *stabilité régulatoire*, a construction that frees them from all risks that come with dismantling nuclear plants.³⁷ However, changes in policies on radioactive waste management could change the total cost of this deal (cf. infra).³⁸ There is also a financial side to this story. EDF Luminus³⁹ owns 10% of Doel 3, Doel 4, Tihange 2 and Tihange 3.⁴⁰ As a partial owner, the company is responsible for the payment of the regular costs and reparation costs.⁴¹ However, in the case of non-active nuclear plants, say during power cuts, EDF Luminus

[economie/belgie/algemeen/sabotage-kerncentrale-doel-is-vier-jaar-later-nog-al-tijd-mysterie/10038413.html](https://emis.vito.be/nl/techniekfiche/gesloten-processen-voor-elektriciteitopwekking-uit-hernieuwbare-brandstoffen). Accessed: 28 February 2019; Joris Truys, (4 August 2017), '3 jaar geleden werd Doel 4 gesaboteerd, van de dader is nog steeds geen spoor', VRT NWS, https://www.google.com/search?client=firefox-b-d&q=onderzoeks_rechter+engels. Accessed: 28 February 2019.

¹³ Nucleair Forum. www.nucleairforum.be. Accessed: 28 February 2019.

¹⁴ OECD NEA, (2010), 'Partnering for long-term management of radioactive waste. Evolution and current practice in thirteen countries', OECD NEA 6823, pp. 2-35.

¹⁵ OECD NEA, (2010),

‘Partnering for long-term management of radioactive waste. Evolution and current practice in thirteen countries’, OECD NEA 6823, pp. 2-35.

¹⁶ OECD NEA, (2010), ‘Partnering for long-term management of radioactive waste. Evolution and current practice in thirteen countries’, OECD NEA 6823, pp. 2-35.

¹⁷ Korneel Delbeke & Maxie Eckert, (12 May 2018), ‘Trillen voor Tihange. Duitse angst voor Belgische kerncentrales’, De Standaard, http://www.standaard.be/cnt/dmf20180511_03509241. Accessed: 28 February 2019.

¹⁸ Melanie Zierse, (3 October 2017), ‘Voor als het ondenkbare gebeurt: de

would not have enough revenue to pay (since there is no energy to sell), and consequently would refuse to pay any reparation costs.⁴²

Since the news of plans for a nuclear step-down by 2025, Engie realized that its ownership of the Belgian energy companies was financially risky. Dismantling the power plants would cost several billions of euros, with extra charges in the following years. The government under Charles Michel first planned on burying nuclear waste 200 meters deep underground. Today they are calculating for a scenario in which they would bury the nuclear waste 400 meters underground. This would create serious changes in the dismantling costs that have to be paid by Engie: from 3,2 billion to 8-10,7 billion euros.⁴³ Furthermore, Emmanuel Macron wants to privatize Engie, and has been prioritizing this for a while.⁴⁴ In order to achieve this goal, Engie would be required to make successful acts on the financial market and consequently the company cannot afford any risks caused by nuclear mismanagement.⁴⁵ Since 2015, Engie has been trying to get rid of Electrabel and its nuclear power plants and return them to Belgian-only ownership. This situation created a complex web, spun by energy companies, politicians and financial lobbyists. The national media came up with a name for this intricate web: “Operation Bianca”.⁴⁶ The name Bianca refers to the famous volume of Hergé’s Adventures of Tintin, “The Castafiore Emerald”. With a humorous wink to our fur-and-jewelry-coated minister Marghem, journalists and researchers support the hypothesis that Engie was responsible for our energy shortages in 2018-2019, due to the closure of our most productive nuclear plants.⁴⁷ For Engie, this is a way for

the French government to defy the Belgian plans to gradually phase out of nuclear energy by 2025. For months, Electrabel denied any possibility of energy shortages. In the summer of 2018, the company suddenly changed its agenda and stated that six of the seven reactors could not be active because of severe degradation in the concrete of the buildings. In order to guarantee our energy provisions, we would need to keep the reactors running until at least 2032.⁴⁸ In other words, it would block any possibility of organizing the planned nuclear step-down. These events have uncovered the weaknesses of this Energy Pact and clear decisions about the reactors have been postponed until the now-imminent 2019 elections in May. Current discussions are fierce and fiery, but only time will tell if and how responsible changes can come into our national nuclear management.

jodiumtablet’, Trouw, <https://www.trouw.nl/home/voor-als-het-ondenkbare-gebeurt-de-jodiumtablet~a61738cd/>. Accessed: 28 February 2019.

¹⁹ Instructions of my personal pill box; Trui Engels, (6 March 2018), ‘Wat je moet weten over jodiumtabletten’, Knack, <https://www.knack.be/nieuws/gezondheid/wat-je-moet-weten-over-jodiumtabletten/article-normaal-973127.html>. Accessed: 28 February 2019.

²⁰ Index Mundi, (2018), ‘Elektriciteitsverbruik per hoofd van de bevolking.’ <https://www.index-mundi.com/map/?v=81000&r=xx&l=nl>. Accessed: 28 February 2019.

²¹ Index Mundi, (2018), ‘Elektriciteitsverbruik per hoofd van de

bevolking.’ <https://www.indexmundi.com/map/?v=81000&r=xx&l=nl>. Accessed: 28 February 2019.

²² S.n., (6 May 2017), ‘FANC: Veiligheid kerncentrales Doel 1 en 2 onvoldoende’, Knack, <https://www.knack.be/nieuws/belgie/fanc-veiligheid-kerncentrales-doel-1-en-2-onvoldoende/article-normal-849335.html>. Accessed: 28 February 2019.

²³ S.n., (24 April 2011), ‘Duizendtal betogers tegen kernenergie’, BRUZZ, <https://www.bruzz.be/samenleving/duizendtal-betogers-tegen-kernenergie-2011-04-24>. Accessed: 28 February 2019.

²⁴ David Dessers, (9 March 2012), ‘Wereldwijde actie voor een kernvrije wereld’, De Wereld Morgen, <http://www.dewereldmorgen.be/artikel/2012/03/09/wereldwijde-actie-voor-een-kernvrije-wereld>. Accessed: 28 February 2019.

²⁵ Nucleair Forum, (s.d.), ‘Campagne 2011-2012 – Kernvragen’, <https://www.nucleairforum.be/campagne/campagne-2011-2012-le-nucleaire-en-clair>. Accessed: 28 February 2019.

²⁶ S.n., (21 January 2012), ‘Jongeren ten strijde tegen Nucleair Forum’, BRUZZ, <https://www.bruzz.be/samenleving/jongeren-ten-strijde-tegen-nucleair-forum-2012-01-27>. Accessed: 28 February 2019.

²⁷ Foratom, (s.d.), ‘About us’, <https://www.foratom.org/about-us/>. Accessed: 28 February 2019; Nucleair Forum, (s.d.), ‘Kernenergie in de Europa: een overzicht’, <https://www.nucleairforum.be/thema/wereldwijd/europese-unie>. Accessed: 28 February 2019.

²⁸ Nucleair Forum, (s.d.), ‘Kernenergie in de Europa: een overzicht’, <https://www.nucleairforum.be/thema/wereldwijd/europese-unie>. Accessed: 28 February 2019.

²⁹ Nucleair Forum Website.

³⁰ S.n., (22 February 2018), ‘Charles Michel: ‘Parlement krijgt inzage in studie, energiepact nog dit jaar’, Knack, <https://www.knack.be/nieuws/belgie/charles-michel-parlement-krijgt-inzage-in-studie-energiepact-nog-dit-jaar/article-normal-968471.html>. Accessed: 28 February 2019.

³¹ S.n., (15 November 2017), ‘Fremaut: ‘Geen nationaal Energiepact zonder uitstap uit kernenergie’’, Bruzz, <https://www.bruzz.be/samenleving/fremaut-geen-nationaal-energiepact-zonder-uitstap-uit-kernen-ergie-2017-11-15/>. Accessed: 28 February 2019.

³² S.n., (30 March 2018), ‘Fremault verheugd over energiestrategie Federale regering: Nu Vlaanderen nog’’, BRUZZ, <https://www.bruzz.be/milieu/fremault-verheugd-over-energiestrategie-federale-regering-nu-vlaanderen-nog-2018-03-30>. Accessed: 28 February 2019.

³³ Christine Scharff, Barbara Moens, & Wim Van de Velden, (10 October 2018), ‘Marghem kan stroombelofte nog altijd niet inlossen’, De Tijd, https://www.tijd.be/politiek-economie/belgie-federaal/Marghem-kan-stroombelofte-nog-altijd-niet-inlossen/10057387?utm_campaign=MORNING_COMMENT&utm_medium=email&utm_source=SIM. Accessed: 28 February 2019.

³⁴ Christine Scharff & Wim Van de Velden, (3 July 2018), ‘Premier en Engie onderhandelen over Nucleaire spaarpot,’ De Tijd, <https://www.tijd.be/politiek-economie/belgie/economie/premier-en-engie-onderhandelen-over-nucleaire-spaarpot/10027970.html>. Accessed: 28 February 2019.

³⁵ Synatom, (s.d.), ‘About Us’, <http://synatom.be/en/about-us/>. Accessed: 28 February 2019.

³⁶ Christine Scharff & Wim Van de Velden, (9 October 2018), ‘Geheime deal over kernuitstap’, De Tijd. <https://www.tijd.be/politiek-economie/belgie/federaal/geheime-deal-over-kernuitstap/10056986.html>. Accessed: 28 February 2019.

³⁷ Christine Scharff & Wim Van de Velden, (9 October 2018), ‘Geheime deal over kernuitstap’, De Tijd. <https://www.tijd.be/politiek-economie/belgie/federaal/geheime-deal-over-kernuitstap/10056986.html>. Accessed: 28 February 2019.

³⁸ Christine Scharff & Wim Van de Velden, (9 October 2018), ‘Geheime deal over kernuitstap’, De Tijd. <https://www.tijd.be/politiek-economie/belgie/federaal/geheime-deal-over-kernuitstap/10056986.html>. Accessed: 28 February 2019.

³⁹ EDF Luminus is the second largest electricity producer and energy supplier of Belgium. See: EDF Luminus, (s.d.), ‘Become the first energy partner’, <https://edfluminus.edf.com/nl/edf-luminus/wie-we-zijn/de-eerste-energiepartner-worden>. Accessed: 28 February 2019.

⁴⁰ Christine Scharff, Barbara Moens, & Wim Van de Velden, (10 October 2018), ‘Marghem kan stroombelofte nog altijd niet inlossen’, De Tijd, https://www.tijd.be/politiek-economie/belgie-federaal/Marghem-kan-stroombelofte-nog-altijd-niet-inlossen/10057387?utm_campaign=MORNING_COMMENT&utm_medium=email&utm_source=SIM. Accessed: 28 February 2019.

⁴¹ Christine Scharff, Barbara Moens, & Wim Van de Velden, (10 October 2018), ‘Marghem kan stroombelofte nog altijd niet inlossen’, De Tijd, https://www.tijd.be/politiek-economie/belgie-federaal/Marghem-kan-stroombelofte-nog-altijd-niet-inlossen/10057387?utm_campaign=MORNING_COMMENT&utm_medium=email&utm_source=SIM. Accessed: 28 February 2019. S.n., (9 October 2018), ‘Geheime deal over kernuitstap in de maak’, BRUZZ, <https://www.bruzz.be/milieu/geheime-deal-over-kernuitstap-de-maak-2018-10-09>. Accessed: 28 February 2019.

⁴² Kleis Jager, (3 January 2018), ‘Voor Frankrijk wordt 2018 het jaar van privatiseringen’, Het Financieel Dagblad, https://fd.nl/ondernemen/1234656/voor-frankrijk-wordt-2018-het-jaar-van-de-privatiseringen?_ga=2.51447529.1109726535.1551983307-1643130101.1551983307#. Accessed: 28 February 2019.

⁴³ Christine Scharff & Wim Van de Velden, (9 October 2018), 'Geheime deal over kernuitstap', De Tijd, <https://www.tijd.be/politiek-economie/belgie/federaal/geheime-deal-over-kernuitstap/10056986.html>. Accessed: 28 February 2019.

⁴⁴ Wim Van de Velden, (6 October 2018), 'Operatie Bianca, hoe Engie af wil van de Belgische kroonjuwelen', De Tijd, <https://www.tijd.be/dossier/weekboekpolitiek/Operatie-Bianca-hoe-Engie-af-wil-van-de-Belgische-kroonjuwelen/10056401>. Accessed: 28 February 2019.

⁴⁵ Wim Van de Velden, (6 October 2018), 'Operatie Bianca, hoe Engie af wil van de Belgische kroonjuwelen', De Tijd, <https://www.tijd.be/dossier/weekboekpolitiek/Operatie-Bianca-hoe-Engie-af-wil-van-de-Belgische-kroonjuwelen/10056401>. Accessed: 28 February 2019.

⁴⁶ Wim Van de Velden, (6 October 2018), 'Operatie Bianca, hoe Engie af wil van de Belgische kroonjuwelen', De Tijd, <https://www.tijd.be/dossier/weekboekpolitiek/Operatie-Bianca-hoe-Engie-af-wil-van-de-Belgische-kroonjuwelen/10056401>. Accessed: 28 February 2019.

HOPE IN THE MURKY WATERS OF THE INTERNATIONAL SHIPPING INDUSTRY

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“Out of sight - out of mind”



This summer, I went on a field trip to Alang-Sosiya in the northwestern state of Gujarat, India, where geriatric vessels are anchored in the shipbreaking yards for their not-so-respectful funeral rights. They are taken apart bolt by bolt, rivet by rivet, down to their very last ounce of valuable metal. This place is

↑ CTG. Ship Breaking 06. Photo by Naquib Hos-sain [CC BY-SA 2.0], via Flickr)

infamously known as the world's largest graveyard for ships. Despite the fact that this "recycling" is making use of vast amounts of material, the negative impacts on the environment unleashed through improper shipbreaking are substantial. Most ships are not properly cleaned of residue oils and fuel before they are sent, and they need to be meticulously dismantled in order to prevent oil spills and other toxins leaching into the environment. As I prepared for my journey, I wondered: Why is India voluntarily involved in this trade of hazardous waste? Is there an end in sight to the export of toxic waste appealingly disguised as "recycling" from the Global North to the Global South? What about the workers who survive by earning their daily living from scrapping these dead ships? As the complexity of these questions drew me towards scholarly despair and narratives of complete declensionism, I stumbled across some hopeful news: Dutch shippers had been sentenced for having demolished ships on an Indian beach. This news made me reconsider my doomy fears and instilled an idea in my head: perhaps it is possible to navigate the Indian shipbreaking industry with a vision of hope.

On 15 March 2018, the Rotterdam District Court in the Netherlands convicted Seatrade, the Groningen based shipping operator and the largest reefer operator in the world, for the illegal export of several 1984-built reefer vessels, namely: Spring Bear, Spring Bob, Spring Panda, and Spring Deli. The ships were exported for scrapping on the beaches of India, Bangladesh, and Turkey in order to save money, due to the lax environmental and safety regulations in these places. This illegal act violated the international laws governing the export of hazardous waste

¹ Bart Meijer, (March 15, 2018) 'Dutch Shippers sentenced for having ships demolished on an Indian beach'. Reuters. Retrieved from <https://in.reuters.com/article/netherlands-shipping-court/dutch-shippers-sentenced-for-having-ships-demolished-on-indian-beach-idINKCN1GR2PQ>.

² Bart Meijer, (March 15, 2018), 'Seatrade convicted for beaching ships', World Maritime News, retrieved from <https://worldmaritimenews.com/archives/247341/seatrade-convicted-for-beaching-ships/>



as well as the EU Waste Shipment Regulations (EWSR). According to these regulations, EU member states are generally prohibited from exporting hazardous waste to countries outside the membership the Organization for Economic Cooperation and Development (OECD) and must acquire prior consent for any such exports. The company has been imposed with fines ranging between EUR 500,000 and EUR 750,000. Furthermore, two of its executives have been banned from working for any shipping company (in any capacity) for one year. A third director has been acquitted. Prison charges were waived by the judges due to the novelty of the case.

In a recent report, NGO Shipbreaking Platform stated that 835 large ocean-going commercial vessels were sold to scrap yards in 2017 alone, 543 of which were broken down on the beaches of Bangladesh, India, and Pakistan. In the light of these disturbing yet revealing data, Ingild Jenssen,

[↑] The reefer ship Spring Bear was dismantled at the Alang ship-breaking yard. Image: [public domain].

³ Ship Recycling, (March 16, 2018), 'Seatrade convicted of Illegal Scrapping', Safety4Sea, retrieved from <https://safety4sea.com/seatrade-convicted-of-illegal-scrapping/>.

founder and director of NGO Shipbreaking Platform, welcomed “this groundbreaking judgment that sets a European-wide precedent for holding ship owners accountable for knowingly selling vessels, via shady cash-buyers, for dirty and dangerous breaking in order to maximize profits.”

What is it that makes illegal shipbreaking so dangerous to the environment? First of all, the scale of the operations. The importance of ships is often invisible to us in our day-to-day lives, yet the International Maritime Organization (IMO) states that “*maritime transport is essential to the world’s economy as over 90 percent of the world’s trade is carried by sea and it is, by far, the most cost-effective way to move en masse goods and raw materials around the world.*”

But the connections between ships and toxicity are still not always obvious. What makes these floating vessels hazardous to both humans and the environment is their deaths at the substandard shipyards of the Global South, which emanate toxicity. Their rebirth is facilitated by the destructive labor forces of the shipyards through the recycling of their valuable materials, like ferrous and nonferrous components, wood, heavy machinery, and technological items in good, reusable condition. However, ships, especially those built before 1992, also contain huge quantities of toxic asbestos: a thermal insulating and fire-resistant material used in engine rooms, corridors, exhaust pipes, fireproof doors, as well as in many other places. In addition, many products on board the vessels, such as insulating materials, batteries, and electrical compounds, contain heavy metals, polychlorinated biphenyls (PCBs) in both solid and liquid forms, and Tributyltin (TBT), which is present in anti-fouling

⁴ IMO Profile, ‘International Maritime Organization’. Business.un.org. Retrieved from <https://business.un.org/en/entities/13>. <https://business.un.org/en/entities/13>.

⁵ NGO-Shipbreaking Platform, ‘Why Ships are toxic’, NGO Shipbreaking Platform. Retrieved from <https://www.shipbreakingplatform.org/issues-of-interest/why-ships-are-toxic/>



paints. Added to this expanding list of toxic materials are mineral oils, bilge, and ballast water. These polluting and hazardous contaminants become all the more life threatening when a ship is demolished – they leach into the environment and come into close contact with workers in the shipyards.

↑ Workers using acetylene torches in Bhatiary Yard 01, Chittagong, Bangladesh. Photo by Naquib Hossain [CC BY 2.0].

The refrigerated Spring class vessels that Seatrade exported for demolition were used for carrying both refrigerated and dry cargo and therefore contained high amounts of hydrochlorofluorocarbons (HCFCs), along with other commonly present hazardous substances. The court determined that Seatrade’s motive for selling the vessels for demolition via a cash buyer, rather than recycling the ships in a safe and clean manner, was purely financial. The district court judge

said: “It is common knowledge that beaching a ship and demolishing it at the spot pollutes water and air, while untrained workers lack the expertise to deal with dangerous materials . . . These practices cause multiple deaths a year.”

To better understand the proceedings of this case, it is important to underline how waste and recycling are understood in the international laws governing the export of hazardous waste. According to EU Waste Shipment Regulations (EWSR), waste means any substance or object that a holder discards, intends to discard or is required to discard. Recycling, on the other hand, means a recovery of materials – in our case primarily steel – without endangering human health and without using processes or methods that could harm the environment. Now, the point of contestation between Seatrade and the public prosecutors was that one party claimed that they had exported the ships for recycling, while the other party charged them for exporting ships for demolition – that is, as hazardous waste. One action is legal, while the other is not.

After evaluating the prosecution’s charges, the district court judges determined that the refrigerated vessels had already been intended for demolition when they left the ports of Rotterdam and Hamburg in 2012, which would categorize the ships as waste despite the fact that they were still seaworthy, certified, insured, and operational. In Seatrade’s defense, executives claimed that the ships were sent to South Asia for “recycling.” The prosecutors countered the defense by stating that substantial quantities of hazardous waste were also exported, including at least

asbestos and HCFCs, making recycling impossible given the substandard operations in place at the Indian, Bangladeshi, and Turkish shipyards.

↓ Shipbreaking in progress at Alang. Photo by Anil C Patel [CC BY 3.0].



Today, Seatrade still disagrees with the court’s judgment that “*fully certified, a seaworthy vessel should be considered waste within the meaning of European Waste Shipment Regulations (EWSR) since the ships were operational till the very last moment and represented millions of euros in value at the time of sale.*” The company therefore plans to proceed to the Hague Court of Appeal for acquittal from the criminal charges levied against it.

What will change with this hopeful court verdict? Authorities in Norway, Belgium, and the UK have

⁷ Fairplay, (6 March, 2019), ‘Seatrade says it is likely to appeal vessel scrapping convention’, Retrieved from <https://fairplay.ihs.com/safety-regulation/article/4298906/seatrade-says-it-is-likely-to-appeal-vessel-scrapping-conviction>.

⁶ H.W.A.A. De Jong, ‘ECLI: NL:RBROT:2018: 2108’, Rechtspraak.nl, Retrieved from <https://www.rechtspraak.nl/Organisatie-en-contact/Organisatie/Rechtbanken/Rechtbank-Rotterdam/Nieuws/Documents/English%20translation%20Seatrade.pdf>.

been paying close attention to the court proceedings and the final verdict, as they are currently investigating similar cases. Seatrade's conviction has underlined the realization by courts of law, investors, and major shipping banks that better ship recycling practices are needed and should be strictly enforced. Moreover, ship owners should be held accountable for their intentional and misinformed actions in the murky world of the international shipping industry. For me, the penalization of the shipping company has helped me to shake my doomful fears and to rethink the issue. It has helped me find hope – hope that the inhabited territories of Alang will not always be treated as a graveyard for toxic ships; hope that one day, workers will not die from slow poisoning as they dissect vessels bolt by bolt, piece by piece, with the help of only the most basic technology. If international ship owners are driven to take prior decontamination seriously, then the concept of recycling – that is the recovery of materials without harming the individuals and their environment – will become possible.

FOR A DIGNIFIED LIFE: REMEDiation PRACTICES IN ECUADOR

Maximilian Feichtner

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“Injustice anywhere is a threat to justice everywhere.”

Martin Luther king, Letter from Birmingham jail,
April 16, 1963

It's oyster mushrooms and some bacteria that give us hope. A hazardous hope, but that's better than nothing. In the last 50 years, the Amazon rainforest of Northeastern Ecuador has turned into a vast agricultural landscape nourished by oil-contaminated soils and rivers. In order to decontaminate soils and sediments, the state owned oil-company Petroamazonas implements large-scale ex-situ bioremediation. As

↓ Texaco oil barrel abandoned in the forest close to the well Agaurico 3 in Ecuador. @Theresa Leisgang



an alternative, local environmental and human rights NGO's envision a much more community-based approach on bacterial bioremediation. Is there a chance to one day re-create this tropical environment, so that it offers again a life in dignity for all its inhabitants?

FOR A DIGNIFIED LIFE: REMEDIATION PRACTICES IN ECUADOR

Like a tiny mushroom, hope is growing in the once lush rainforest of the Amazon in northeastern Ecuador: bioremediation as a solution to the extensive environmental contamination. It is a hazardous hope, however. Hazardous because it relates to a dangerous place: over the course of more than 50 years of intense settler colonization and careless hydrocarbon exploitation, the region has turned into a vast agricultural landscape nourished by polluted soils and rivers. Just as the tropical landscape has been deteriorating since the advent of oil production in the 1960s, so too is the health of the local population deteriorating. Settlers, indigenous people, and wild and domestic animals are suffering from the contamination caused by decades-old oil pits, ongoing gas flaring, and almost weekly oil spills. Many of the local population's stories are tragic: lost family members, malformed babies, and no means to overcome the contamination that pervades daily life.

Another reason that this tiny hope can be framed as hazardous is that hope itself is under siege. The local population has been deceived repeatedly – with blatant lies denying the dangers of oil production, as well as with broken promises to halt pollution. Nonetheless, cautious hope remains that the

environmental contamination might be remediated, making it possible for the inhabitants of the Ecuadorian Amazon to lead a dignified life once more. Here, somewhere between the oil towns of Lago Agrio, Sacha, and Shushufindi, the former epicenters of Texaco's operations in Ecuador, I conducted five months of fieldwork in the first half of 2018 for my PhD thesis on the environmental history of the Amazon. I did not only contribute to documenting the impacts and transformations of oil production, but I was also looking for glimmers of hope – however hazardous they might be. In the process, a fundamental question presented itself. Given that the oil industry has been imposed from outside in the form of transnational companies like Texaco, and the national government, shouldn't relief and a proper cleanup also come from outside?

↓ Site of a recent oil spill due to a corroded pipeline just north of Lago Agrio. A family's home lies just a few meters away.
@Maximilian Feichtner



HOW TO CLEAN UP THE SOIL

The large-scale contamination of bodies of water, soils, forests, and the air as a result of industrialization and resource extraction is one of the major environmental challenges humanity is facing in the twenty-first century. This is as true for the many Superfund sites harboring hazardous waste in the US as it is for the Ecuadorian Amazon forest. However, the environmental (and consequently social) damage caused by the transnational oil industry in the small Latin American country goes far beyond pollution from oil spills and (toxic) waste dumps. The ecological relations within the tropical ecosystems of streams, lagoons, and swamps have been altered: deforestation has led to erosion and the sedimentation of rivers, noise has driven away animals, and hunting has decimated wildlife and reduced biodiversity – a whole range of detrimental environmental processes that reinforce one another and have fundamental impacts on local communities and their subsistence. The cultural and social consequences include the expropriation of territories, the disintegration of indigenous communities and a high percentage of child mortality. Despite the country's wealth in this area, which derives from the fossil resources found beneath the lush green forest cover, the local population is left in poverty. The lack of infrastructure is a manifestation of insufficient care and attention for these communities. Recent estimations of cancer rates for the oil region reveal shocking results: in every four families there is at least one cancer patient. The state of human health forms an alarming backdrop to the oil region, painting a bleak picture for more-than-human life in the Amazon forest as well.

It therefore does not seem far-fetched to demand that the state and the oil multinationals who have profited from this extraction contribute to the remediation of the environmental contamination, reparations for social damages, and the restoration of better living conditions. The Ecuadorean environmental activist community is vigorously pushing for actions and policies to restore the rights of the affected, to improve their situation, and to prevent the repetition of these aggressions. A tentative consciousness about the need for such reparation and remediation has slowly been emerging since the 1990s. Some steps were taken at the time, but has the situation improved? Is there any hope for the local population to one day live a dignified life in a healthy environment?

Common remediation practices for crude oil contamination include the use of chemical solvents or incineration. However, while these appear to be effective in some cases, they are neither desirable (simply replacing one kind of pollution with another) nor feasible at a regional scale in an area where people physically live on contaminated soil. The Ecuadorian government and local NGOs have opted for bioremediation instead, which harnesses the potential of microorganisms like bacteria or fungi to naturally degrade hydrocarbons. In the 1990s, public and private companies, sometimes in collaboration with national universities, started to research decontamination and took some first steps towards treating oil-polluted soils and sediments in the Ecuadorian Amazon. The process generally involves clearing a contaminated site of vegetation, before the soil is then dug up and transported to treatment sites. One of the main ex-situ bioremediation techniques involves us-

ing bacteria for composting, where large piles of soil are aerated with machinery. The supply of oxygen is essential in order to keep the naturally occurring bacteria alive and well. These organisms are well adapted to their hydrocarbon environment – in Texaco’s open-oil and waste pits they have had about 50 years to do so. These kinds of bacteria are cultivated and applied to the compost piles, where they disintegrate the hydrocarbon content. The second bioremediation technique, landfarming, involves the biodegradation of the pollutants with the same bacteria in very flat piles that don’t require active aeration. Once treated, the soil is returned to its original site and the area is either reforested or replanted with crops like cacao or coffee, depending on its previous use (presentation of the Amazonia Viva project, April 2018).

UNFULFILLED PROMISES ... AND WORSE

Promising and necessary as it seems, the remediation of oil-polluted soils in Ecuador has been a shabby business if not an outright deception. Most prominently, Texaco undertook a big remediation “effort” in the mid-1990s to clean up part of their 30-year legacy of rather profitable contamination in the northeastern part of the Ecuadorian Amazon. Their efforts consisted mainly of covering up oil pits with a layer of soil. The recurrent rains kept washing pollutants from these sites into the surrounding area where, a few years later, unsuspecting settlers would build their houses – a situation reminiscent of the Love Canal near Niagara falls, a former chemical disposal site whose hazardous waste affected an entire local community.

In the 2000s, things became even more twisted: bioremediation turned into a veritable business, with a few private companies being awarded profitable contracts to clean up spills. What resulted, however, was a rise in the sabotage of oil pipelines: intentional spills combined with corruption in politics and economy led to the lucrative awarding of remediation contracts often worth millions of dollars. Consequently, this kind of collaboration was suspended and the public oil company Petroecuador and its subsidiary Petroamazonas relied on their own bioremediation programs.

THE AMAZONÍA VIVA PROJECT: A STEP FORWARD

During an interview at Petroamazonas’s headquarters in Quito, the head of the Amazonía Viva program proudly insisted on having reached a major milestone

↓ Piles of contaminated soil at a bioremediation plant of the Amazonía Viva project. © Theresa Leisgang



in the remediation history of the country at the end of 2017. In only four years, she told me, the project had remediated one million cubic meters of contaminated soil and about 750 sources of pollution. Their success story also includes the active hiring of a local workforce at the remediation sites in the Amazon.

But on site, the picture is quite different. Imagine a huge, leveled area next to an abandoned oil well, covered with dozens of piles of oil-trenched soil, each about 3 meters high and approximately 30 meters long. A handful of workers walks around, filling buckets with bacteria-treated liquid from a big tank – the stench is overwhelming. Everything is quiet. Hesitantly, the workers answer a few questions, revealing that the piles of compost are only turned – and thereby aerated – about every three months when the required tractors and excavators are brought in. Since the project does not seem to comply with the aeration standards outlined in a Petroecuador manual from 2010, it is questionable whether the aerobic bacteria can even survive under these circumstances and ensure the degradation of hydrocarbons on such a large scale. Additionally, the drainage system is very basic, consisting mainly of two little basins to collect the contaminated rainwater that has washed through the piles of soil. Oil residues swim on the surface of these basins and are allegedly recovered. Without further treatment to filter heavy metals and other pollutants, the wastewater runs into the nearby stream, a local activist tells me.

While this centralized, top-down, large-scale remediation effort is certainly a big step forward in decontaminating the area, my observations on site show that these efforts are neither comprehensive nor do they involve the local communities. This calls

into question whether oil companies are the right actors to carry out remediation in the first place: “[I]n a thorny issue like contamination, it does not seem appropriate for the same actor to be the banker, judge, accomplice, and entrepreneur, etc. It seems a mistake to give the job of clean-up and oversight to the polluter,” say researchers Cuvi and Bejarano.

MEDICINE FOR THE SOIL

Given the public oil company’s active but inadequate attempts, it is up to NGOs and committed locals to create inclusive bottom-up solutions that help regenerate the environment they live in. One such local is biologist and mushroom enthusiast Alexis Gropper who lives at the outskirts of Lago Agrio. Right next to an abandoned oil well, her husband’s family reforested a former cattle ranch that is now also home to her fungi lab and cultivation station. Oyster mushrooms (*Pleurotus ostreatus*), Reishi (*Ganoderma Lucidum*), and Turkey Tale (*Trametes versicolor*) are three types of “petrophile” fungi that she identified thriving on and around oil pits in the region where they had, over the course of decades, adapted to a crude-oil diet. These fungi not only have medicinal properties, they also create enzymes that split up hydrocarbons.

What distinguishes them from bacteria and makes them essential for a holistic bioremediation process is their ability to accumulate heavy metals, such as mercury, in their fruits. Once absorbed and stored by the mushrooms (or different kinds of plants), the heavy metals can be “harvested,” removed from the contaminated site, and then treated as hazardous waste. One option is incineration and



↑ Biologist Alexis Gropper gives a compelling introduction to bioremediation right next to her fungi lab in Lago Agrio. @Maximilian Feichtner

subsequent storage in a safe place, which could be as simple sealing them in road asphalt. However, Alexis Gropper told me during a lab visit in February 2018: “For now, bioremediation methods using bacteria and plants have proved to be easier to propagate on larger scales, and are very efficient in the decomposition of chemicals and bioaccumulation of heavy metals *if and when* the procedures are implemented correctly.” Her vision to help the forest recuperate involves fostering symbiotic relationships between plants, fungi, and bacteria.

That these symbiotic relationships also need to include the human population of the area – indigenous and settler communities – is evident to the local NGO UDAPT. As a grassroots organization, UDAPT envisions an on-site, community-based, empowering way of treating soils and water. Members want the local population to identify with the remediation

process and additionally create benefits for the local economy of this structurally marginalized region.

In April this year, UDAPT made great progress by signing a joint agreement with the bacteriologist Robert Rawson and the environmental NGO CoRenewal to design and implement the Bioremediation Investigations and Capacity Building Project in the affected provinces of Sucumbíos and Orellana. This project aims to establish a comprehensive socio-environmental recuperation plan and includes an open-ended bioremediation investigation, as well as a training and certification process that will be carried out for those people residing in the affected area.

Rawson will make his patented microbial technology – a blend of beneficial, nontoxic *Pseudomonas* and *Bacillus* bacteria species – available to the inhabitants of the Amazon. The process of incubating and applying the bacteria is highly labor intensive and hence presents considerable job opportunities regarding large-scale application. Furthermore, this bioremediation technology not only favors labor over capital, but also favors local communities as they can adapt these methods to their own environment, as Alexis Gropper points out.

This remediation effort will be carried out in close cooperation with the affected communities and is open to all kinds of symbiotic relationships and solutions. The benefits are numerous: proper decontamination will decrease adverse health impacts of living in the area; the creation of employment opportunities that are not dependent on the petroleum industry will provide social, cultural, and economic growth for the northern Amazon region of Ecuador. While this is still a tentative hope, it is certainly less hazardous than it



↑ Thriving Oyster mushrooms in Alexis Gropper's lab which, in this case, are grown for consumption and hence free from heavy metals and other pollutants. @Theresa Leisgang

has been in the past. Remediation cannot be based on a technological, chemical fix alone, but has to grow out of a community-based, symbiotic effort. However, the challenge of cleaning up five decades of a contaminated past is enormous – hopefully, in time, it will be possible to recreate a healthy tropical environment that nourishes, rather than poisons, its inhabitants.

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NEW HOPE FOR PLASTIC WASTE POLLUTION?

Jonas Stuck

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20, 2018

“Poison is in everything, and nothing is without poison. The dosage makes it either a poison or a remedy.”
Paracelsus

TEASER

Let me introduce *Ideonella Sakaiensis*, the bacterium that eats PET for breakfast, lunch and dinner. This bacterium and his loyal friend, the enzyme PETase are the new hope in the fight against the hazardous plastic waste pollution. We all know that there is no simple technical fix to this global problem, but this scientific advancement could become a cornerstone for cleaner oceans, forests and cities. This blog post is not an excuse to lay back and pat oneself on the back. It should, however, be a positive ode to people taking on responsibilities in order to solve difficult problems. At the same time, we should continue to raise provocative questions that are food for thought and talk about hope within these hazardous dilemmas.

DISCOVERY CREATES NEW HOPE

In 2016, a new actor entered the main stage and brought new optimism into the fight against plastic waste pollution. Let me introduce *Ideonella Sakaiensis*. A group of researchers from the Kyoto Institute of Technology and Keio University discovered this bacterium outside a plastic bottle recycling factory in the port city of Sakai, Japan. It was identi-

¹ Mark Lorch, (March 10, 2016), 'New plastic-munching bacteria could fuel a recycling revolution' in 'The Conversation', retrieved from <https://the-conversation.com/new-plastic-munching-bacteria-could-fuel-a-recycling-revolution-55961>.

² Jesslyn Shields, (April 26, 2018), 'Plastic-Eating Enzyme May Be Our Planet's New Hope,' in 'howstuff-works', retrieved from <https://science.howstuff-works.com/environmental/green-science/plastic-eating-enzyme-planets-new-hope.htm>.

³ Chris Lydgate, (May 2, 2018), 'Bio Major Breeds Microbes That Eat Plastic,' in Reed Magazine, retrieved from <https://www.reed.edu/reed-magazine/>

fied as the first bacterium capable of breaking down PET plastic. Prior to this discovery, only a small number of fungi were known to be able to do the same (for other uses of fungi see the article by Maximilian Feichtner in this cahier). Human-nature relationships are often portrayed in negative ways, which can scare audiences away from environmental engagement. However, the way we tell stories is beginning to change: we have begun to focus more frequently on hopeful narratives.

We have probably all seen the headlines about how plastic-eating bacteria are going to rescue our planet. They are apparently the key to a “recycling revolution”¹ and could dissolve our hazardous fears of a plastic-polluted planet. An enzyme that promises to save the planet!² Have we finally found a glimpse of hope in all this chaos? Let's take a look behind the scenes here and assess whether there is reason to be hopeful.

PLASTIC FOR BREAKFAST, LUNCH, AND DINNER

Polyethylene terephthalate (PET) is an environmental nightmare. The plastic is biologically inert, notoriously resilient, and takes years, maybe even centuries, to break down. Around 480 billion plastic PET bottles are manufactured every year, and after they have served their single-use purpose, many wind up in the environment.³ One result is the infamous trash vortex in the Pacific Ocean that is currently the size of France (see the final post in this series by Simone Müller). This shows that the bacteria certainly have a lot of PET to choose from!

Plastics are polymers: long, thin molecules made up of repeating monomer building blocks. They have a cross-linked structure in order to build a durable, flexible mesh. Most plastics derive from carbon-based monomers, so theoretically they are a good source of food for microorganisms. But unlike natural polymers – for instance, cellulose in plants – plastics do not generally biodegrade. Here, bacteria and fungi come into play. They usually coevolve with natural materials, constantly coming up with new biochemical methods to acquire resources from “dead” matter. Plastics were only invented 70 years ago, so microorganisms simply have not had enough time to evolve the necessary biochemical tool kit to hook onto the plastic fibers, break them up into smaller parts, and then utilize the resulting carbon and other chemicals as a source of energy and growth. Or have they?

Two years ago, the Japanese team found a plastic-eating microbe by rummaging around in piles of waste. Five fruitless years of searching and 250 samples later, the research finally paid off and they isolated *Ideonella Sakaiensis*. The researchers' discovery of the first bacterium that lives on PET brought hope for a better future. You may think this is the return of an old story, since other plastic-eating microbes have already been touted as saviors of the planet. But there are several important differences here. Firstly, unlike previous PET eaters like fungi, which were trickier customers, this bacterium is uncomplicated to grow and easy to handle. The researchers more or less left the PET in a warm jar with the bacterial culture and some other nutrients, and a few weeks later, all the plastic was gone. Secondly – and more importantly – the team has identified the enzyme that *Ideonella Sakaiensis* uses

<articles/2018/bacteria-eat-plastic.html>.

⁴ Lorch, 're-cycling revolution.'

⁵ Shields. 'New Hope.'

⁶ Emily Flashman, (April 20, 2018), 'How plastic-eating bacteria actually work – a chemist explains,' in Independent, retrieved from <https://www.independent.co.uk/news/science/plastic-eating-bacteria-chemist-science-pollution-pet-recycling-a8311811.html>.

⁷ For example, the German research network about plastic in the environment: Plastik in der Umwelt, 'Hintergrund,' accessed May 4, 2018, <https://bmbf-plastik.de/index.php/hintergrund>.

⁸ Harry P. Austin, Mark D. Allen, Bryon S. Donohoe, Nicholas A. Rorrer, Fiona L. Kearns, Rodrigo L.

to breakdown the PET⁴; this enzyme is now known as PETase. All living things contain enzymes, which they use to speed up necessary chemical reactions. Some enzymes, for example, help us to digest our food by dismantling it into useful building blocks. Without them the body could not access certain sources of food – for example, lactose-intolerant people lack the enzyme that breaks down the lactose sugar found in dairy products. PETase essentially releases the carbon in PET as a food source for the bacteria. This new enzyme has specifically evolved for this job and literally needs to eat plastic or the bacteria will not exist.⁵

THE NEW SUPER ENZYME

The discovery of *Ideonella Sakaiensis* and the enzyme PETase has naturally caused huge excitement and reignited hope in the fight against plastic-pollution. In the past 12 months, scientists from all over the world have used this discovery as a springboard for new developments, many of which have made headline news.⁶ For example, while studying the enzyme, UK scientists at the University of Portsmouth accidentally engineered a super enzyme that degrades plastic even more efficiently than the natural enzyme from the bacterium first discovered in Japan.⁷ One of the study's lead authors, Gregg Beckham, explained in a press release: "*What we've learned is that PETase is not yet fully optimized to degrade PET – and now that we've shown this, it's time to apply the tools of protein engineering and evolution to continue to improve it.*"⁸ The scientists have already improved the enzyme by about 20 percent but this is apparently only the beginning.

The goal of the research is to find an enzyme efficient enough to break down huge amounts of PET into its components so it can be remade into plastic bottles; true sustainable recycling so to speak.⁹ Other enzymes are already used in industrial applications, such as in the production of biofuels, or biological washing powder. Could scientists build on this knowledge and start using enzymes to clean up our mess? And if everything looks so rosy, why are we not starting to see initial practical applications of this technology?

A HAZARDOUS OPTIMISM

Let's take a step back and think about what would happen if we used this super enzyme for recycling. Many experts have dismissed the idea of adding the original bacteria or a genetically enhanced version to the environment in order to speed up the degradation of plastic debris. At the moment, they argue, there are too many unknown side effects for the ecosystem. "*A full life-cycle assessment would be needed to ensure the technology does not solve one environmental problem – waste – at the expense of others, including additional greenhouse gas emissions,*"¹⁰ says Professor Adisa Azapagic from the University of Manchester. Such caution seems sensible – what if these plastic-eating bacteria turn hazardous? The possibility calls into question whether the industrial-scale production of enzymes and genetically modified bacteria is actually a good idea.

While the modified bacteria used in controlled bioreactors are highly contained, spraying PET-eating organisms onto the waste vortex in the oceans would

Silveira, Benjamin C. Pollard et al, (2018), 'Characterization and engineering of a plastic-degrading aromatic poly-esterase,' in 'Proceedings of the National Academy of Sciences 115', no. 19, retrieved from <https://doi.org/10.1073/pnas.1718804115>.

⁹ NREL, (April 16, 2018), 'News Release: Research Team Engineers a Better Plastic-Degrading Enzyme,' NREL, retrieved from <https://www.nrel.gov/news/press/2018/research-team-engineers-a-better-plastic-degrading-enzyme.html>.

¹⁰ Damian Carrington, (April 16, 2018), 'Scientists accidentally create mutant enzyme that eats plastic bottles,' The Guardian, retrieved from <https://www.theguardian>.

spread them virtually everywhere. (PET also sinks in seawater.) The fact that the bacteria have evolved to degrade and consume plastic suggests this material we rely on so heavily may not be as durable as we thought.¹¹ If more bacteria began eating plastic in the wild, many “durable” products and structures could come under threat. The plastic industry would face the serious challenge of preventing its products from becoming contaminated with hungry microorganisms. Lessons from antibiotics teach us that we are slow to outsmart bacteria.

Additionally, the structure of PETase is very similar to another enzyme that bacteria use to break down cutin. Cutin is the protective coating of many plants. Up to now, nobody knows how PETase evolved, so the enzyme was tested on polyethylene furandicarboxylate (PEF), a plant-based alternative to PET. The research team from Portsmouth discovered that PETase actually works better on PEF than PET.¹² If we invent an enzyme on steroids that is closely related to an enzyme that can break down the protective layer of plants, will those super enzymes develop further and turn against the “environment”?

We should not worry too much about that at the moment. These enzymes are not really present in nature, yet. We would first need to produce the enzyme and then add it to the PET plastic to degrade it. However, if we have gone to the trouble of collecting PET waste, there are far better ways to recycle or dispose of it. Wim Soetaert, head of the Industrial Biotechnology Centre at the University of Ghent suggests that the use of commercially available biodegradable bioplastics would be a better bet. But the true challenge is

¹¹ Flashman, ‘Actually work.’

¹² NREL, ‘News Release.’

making sure that plastic waste does not escape into the environment in the first place. That means improving waste-processing infrastructure – not nearly as exciting as plastic-eating bacteria – should be our priority. Almost a third of all plastic packaging escapes collection systems and ends up in nature or clogging up infrastructure.¹³

This recent study could mistakenly lead many to believe that the danger of plastic pollution can be and is being solved. The fact is, plastic consumption is not declining. In 2000, 300 billion plastic drinking bottles were bought.¹⁴ If policy makers do not impose further bans on single use plastics, this number is expected to increase to 583.3 billion by 2021.¹⁵ Therefore, instead of actively choosing to change our consumption patterns and lifestyles, many might actually interpret these studies as justifying our continued consumption of plastics. We all know there is no single, simple technical fix for this highly complex topic. However, there is a desperate need to change recycling and consumption systems on a wide scale; reducing the volume of throwaway plastic packaging and making sure plastic is collected and separated effectively. The scientists who work on plastic-eating bacteria are taking their responsibility seriously and providing hope in a desperate situation. Putting all pros and cons aside, an enzyme alone cannot clean up the complex, unjust, and widespread legacy of plastic pollution that we have already created, but it is a sign of hope in the struggle against hazardous plastic waste pollution.

¹³ Tiffany Ap, (March 11, 2016), ‘New plastic-eating bacteria could save planet,’ CNN, retrieved from <https://edition.cnn.com/2016/03/11/world/bacteria-discovery-plastic/index.html>.

¹⁴ Akshit Sangomla, (April 20, 2018), ‘Plastic-eating bacteria won’t check plastic waste, reducing our consumption will,’ DownToEarth, retrieved from <https://www.downtoearth.org.in/news/waste/faster-plastic-eating-bacteria-won-t-check-plastic-waste-reducing-our-consumption-will-60244>.

¹⁵ Sandra Laville, and Matthew Taylor, (June 28, 2017), ‘A million bottles a minute: world’s plastic binge ‘as dangerous as climate change’, The Guardian,

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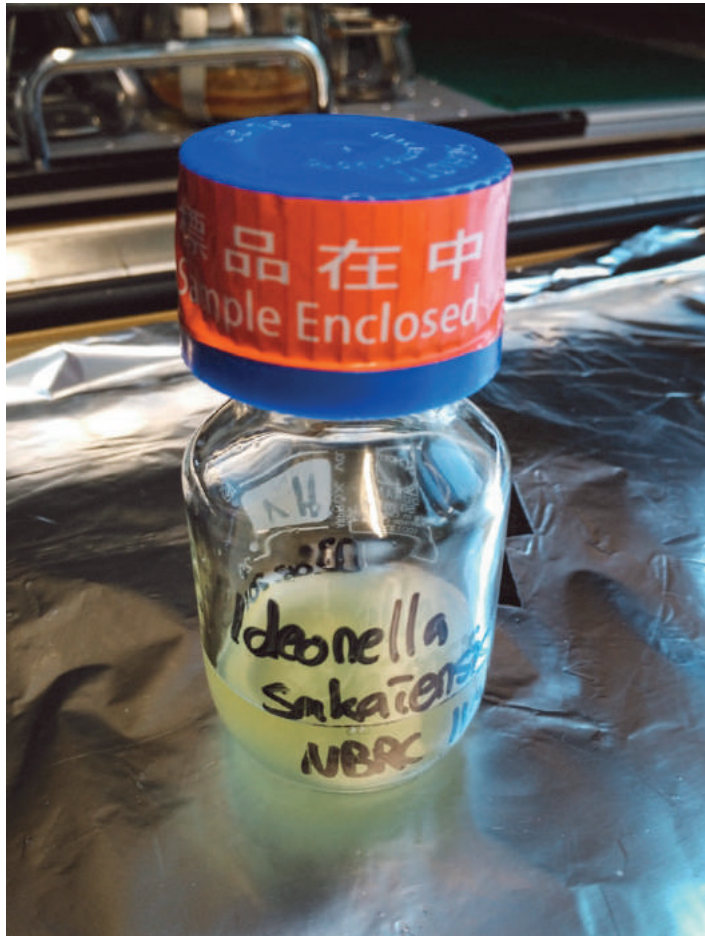


Photo 1: The star of the show; *Ideonella Sakaiensis*. Research on the bacteria is done all over the world, also by the GFZ in Potsdam, Germany. There is still a long way to go before we can implement this science on a larger scale. This little bottle, for example, costs over 400 Euros, but could it be the solution to our plastic waste pollution crisis? By Jonas Stuck

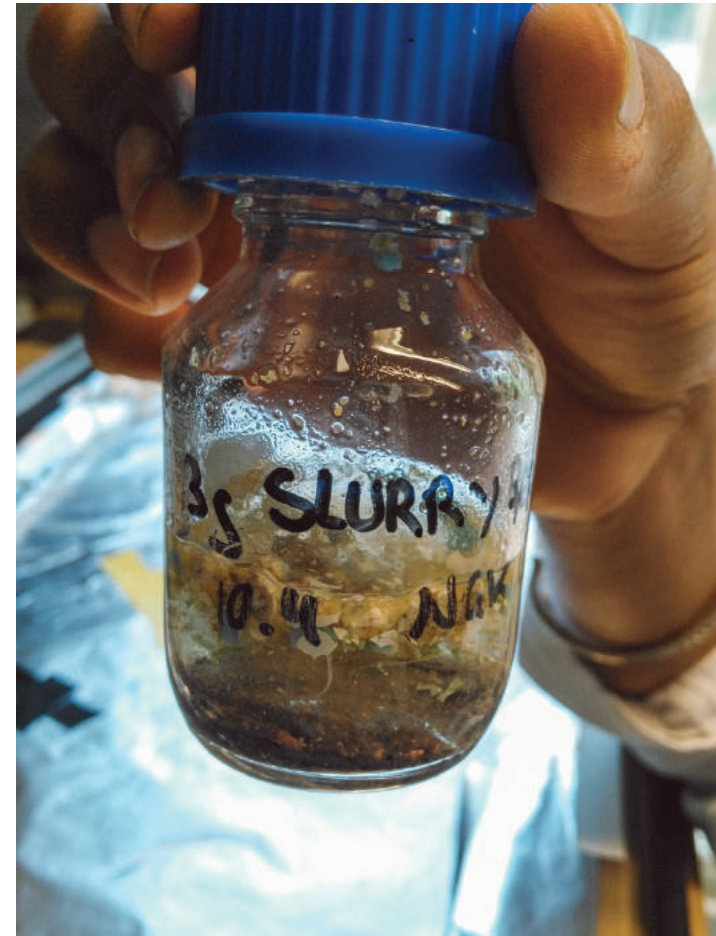


Photo 2+3: Jonas Stuck. From the field to the laboratory. Collecting samples, so called “slurries” from an illegal waste site in Brandenburg, Germany. Are there any plastic eating bacteria in there? A team of Japanese researchers found the plastic eating bacterium on a parking lot outside a bottle recycling plant. By Jonas Stuck



Photo 3

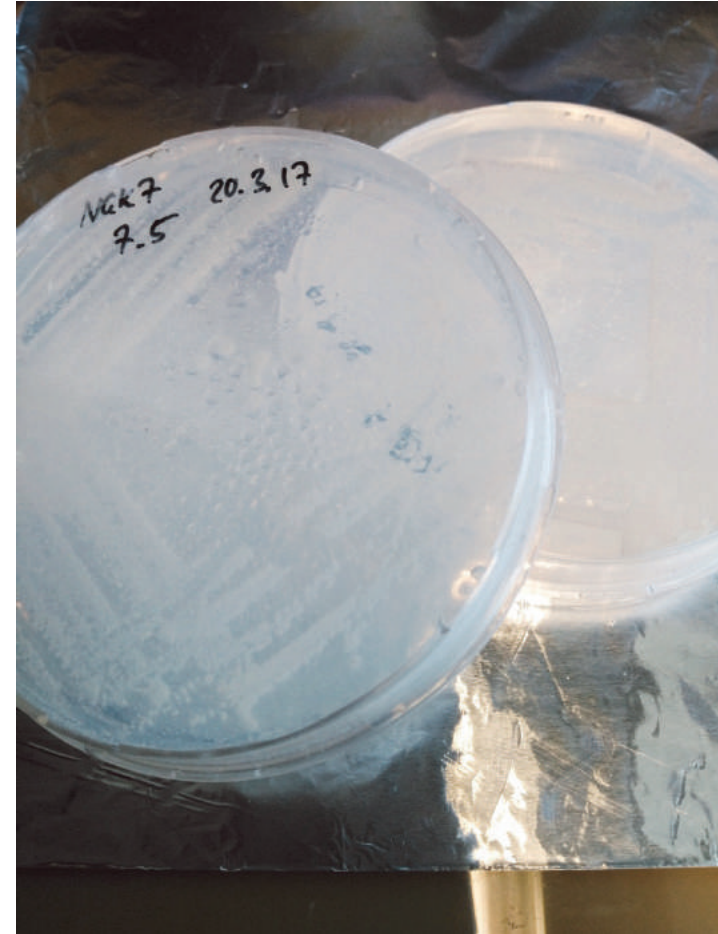


Photo 4: Petri dishes with bacteria cultures that are ready for DNA sequencing. This is necessary in order to find enzymes that are responsible for the breakdown of PET. Enzymes are catalysts that speed up the break down of the PET. By Jonas Stuck



Photo 5: Jonas Stuck. Unsorted waste from an illegal waste site in Brandenburg, Germany. where plants are slowly growing over the waste. This shows how difficult it is to collect waste and prepare it for the bacteria. By Jonas Stuck

IN THE EXHIBITION SPACE, ON LAYERS OF ORANGE PAINT - REMINISCENT OF A HIGHLY TOXIC ORPIMENT USED AS ORANGE PIGMENT FROM ANTIQUITY UP TO THE 19TH CENTURY - HISTORICAL FACTS, PROVERBS, VARIED LITERARY STORIES AND SCHOLARLY TEXTS WERE PRESENTED, PREDOMINANTLY BUT NOT EXCLUSIVELY RELATED TO TOXIC TALES IN BELGIUM. TOGETHER WITH THE ARTWORKS, THEY SHED LIGHT ON HOW THE TOXIC IS EXPERIENCED, UNDERSTOOD AND RESPONDED TO, BOTH PERSONALLY AND IN COMMUNITIES.

BELOW, YOU CAN FIND A SELECTION OF THOSE TEXTS.

“One morning, so the story goes, the American artist James Abbott McNeill Whistler was feeling a little off-color. Of course he is, boomed a friend unsympathetically. “He’s been painting that white girl for days”. In Western Culture a woman wearing white so often represents purity that it is easy to imagine the paint itself having that squeaky-clean reputation as well. But in China and Japan the colour represents death and sickness in general and funerals in particular - and for some this is a more appropriate way to think about the colour.”

Victoria Finlay, (2007), ‘Color: A Natural History of the Palette’ Random House Publishing Group

“If you look at Dutch still-life paintings, lead white is everywhere. You can see it in the glimmer of a silver jar, the snarl on a dog’s canine, the slimy shine on a mass of deer entrails, or the shimmer on a pomegranate seed. Fresh or putrid, they all need to shine”.

Victoria Finlay, (2003), ‘Color: A Natural History of the Palette’ Random House Publishing Group

“From antiquity to the end of the 19th Century, a volcanic mineral found in sulphurous fumaroles (great gashes in the Earth’s crust) was a significant source for the harvesting of orange pigment. The highly toxic orpiment, rich in lethal arsenic, ripens from mellow yellow into outrageous orange when subjected to the heat of a fire. Convinced that the luminous shimmer of orpiment (its name is a contraction of Latin aurum, meaning ‘gold’, and pigmentum meaning ‘colour’) must be a key ingredient in concocting the Philosopher’s Stone, alchemists for centuries risked exposure to the noxious substance. So did artists. To dabble in the occult of orange was to flirt with mortality and immortality in equal measure.”

Kelly Grovier, (2018), ‘The toxic colour that comes from volcanoes’, BBC culture online, retrieved from URL: <http://www.bbc.com/culture/story/20180227>

“Agent Orange was one of a class of color-coded herbicides that U.S. forces sprayed over the rural landscape in Vietnam from 1961 to 1971 to defoliate trees and shrubs and kill food crops that were providing cover and food to opposition forces. It was a 50/50 mixture of two herbicides: 2,4-D and 2,4,5-T. It remained toxic for only days or weeks and then degraded. However, it also had a toxic contaminant, dioxin, that did not degrade as readily and is still causing health problems in Vietnam.”

The Aspen Institute, ‘What is Agent Orange?’, retrieved from: <https://www.aspeninstitute.org/programs/agent-orange-in-vietnam-program/what-is-agent-orange/>

“Poison is a stealth killer, effective in minuscule amounts, often undetectable. It’s the treachery in the

arsenic tainted glass of wine. The fatal attraction: Snow White’s poison apple, the death defying art of the snake handler, the Japanese roulette practiced by those who eat fugu. Without poison, comic book superheroes and villains in plays and movies would be considerably duller. Spiderman exists by the grace of a radioactive spider bite. The rise of the Teenage Mutant Ninja Turtles can be traced to their fall (as pet turtles) into a sewer along with a container of toxic materials. Laertes used a poison-dipped sword to kill Hamlet, and Claude Rains’s nasty mother kept sneaking poison drops into Ingrid Bergman’s drinks in the Hitchcock thriller Notorious.”

Cathy Newman, (2018), ‘Pick your poison - 12 toxic tales’, National Geographic magazine, retrieved from: <https://www.nationalgeographic.com/science/health-and-human-body/human-body/poison-toxic-tales/>

“There was a strange stillness. The birds, for example – where had they gone ? Many people spoke of them, puzzled and disturbed. The feeding stations in the backyards were deserted. The few birds seen anywhere were moribund; they trembled violently and could not fly. It was a spring without voices . On the mornings that had once throbbed with the dawn chorus of robins , catbirds , doves , jays , wrens , and scores of other bird voices there was now no sound; only silence lay over the fields and woods and marsh.”

Rachel Carson, (1962), ‘Silent Spring’ , Houghton Mifflin, p.1

“City after city, state after state, had essentially failed in their efforts to protect their air and their water, the land, the health of their citizens. By 1970, our city skylines were so polluted that in many

places it was all but impossible to see from one city skyscraper to another. . . . We had rivers that were fouled with raw sewage and toxic chemicals. One actually caught on fire. There was a very famous photograph from my teenage years of the Cuyahoga River burning. In fact, it was memorialized in a song at the time.”

Carol M. Browner, (2001) ‘Environmental Protection: Meeting the Challenges of the Twenty-First Century’, HARV. ENVTL. L. RV. 329, 330-331

“Waste is classified as hazardous when it displays properties (i.e. oxidising, explosive, flammable, irritant, toxic, etc.) that make it dangerous or potentially harmful to human health or the environment.”

National Waste Report, (2012), Environmental Protection Agency of Ireland, p.60

“Put in a nutshell, the instruction manual for externalization professionals reads pretty simple. First rule: exploit nature, use cheap labor, sell your goods, and monopolize ecological sinks at some place out there in the world. Second rule: enhance prosperity, promote mass consumption, organize ‘intelligent’ and ‘clean’ production, and grant social rights at home. And, third rule, see to it that the access to the outer world is open, while preventing it from having access to your own world.”

Stephan Lessenich, (2015), ‘Die Externalisierungsgesellschaft: Ein Internalisierungsversuch’, Soziologie 44:1, pp 1-12

“There are several key weaknesses, or ‘cracks’ in existing agreements that allow the trade to continue, often in ways that are not the most environmentally sound.”

Jennifer Clapp, (2002), ‘Seeping Through the Regulatory Cracks: The International Transfer of Toxic Waste’, SAIS Review, 22(1), p. 141-155.

“There are treatments for the neutralization of industrial wastewater; there are ways to split, activate, de-activate and change the molecular composition of certain chemicals; there are incinerators to burn the waste, as well as furnaces and boilers. However, there is also the danger of polluting the environment and the humans.”

Zeynep Kubat, (2019), ‘Discovering Deadly Affairs in Belgium’, Extra City Cahier #5.

“Hazardous waste is being dumped in pits or waters (rivers, seas, oceans), incinerated in open air, buried underground or injected into deep wells.”

Zeynep Kubat, (2019), ‘Discovering Deadly Affairs in Belgium’, Extra City Cahier #5.

“Panama, the Bahamas, Puerto Rico, Bermuda, the Dominican Republic, Honduras, Guinea-Bissau, the Dutch Antilles, Haiti – a short stop. An illegal discharge of some cargo – Delaware Bay, somewhere in Africa, Yugoslavia, Singapore – an empty cargo ship. Three names. Three owners. Khian Sea – Felicia – Pelicano. 1986 to 1988. What reads like the breathless race of around the world in 80 days, but is the itinerary of one of the most infamous waste barges of our time – the Khian Sea. Loaded with roughly 14,000 tons of incinerator ash from Philadelphia, she roamed the oceans for close to two years, always on the lookout for a dumping place for its waste cargo but ul-

timately becoming the face of a global campaign against the trade with hazardous waste leading to the Basel Convention on the Transboundary Movement with Hazardous Waste Material.

Now, more than 30 years later, the trade with hazardous waste is in many instances illegal - theoretically.”

Simone M. Müller, Principal Investigator of “Hazardous Travels: Ghost Acres and the Global Waste Economy” at the Rachel Carson Center.

“The boomerang effect strikes precisely those wealthy countries which had hoped to get rid of hazards by transferring them overseas, but then had to import cheaper foodstuffs. The pesticides return to their highly industrialized homeland in the fruit, cacao beans and tea leaves. The extreme international inequalities and the interconnections of the world markets move the poor neighborhoods in the peripheral countries to the doorsteps of the rich industrial centers.”

Ulrich Beck (1992) ‘The Risk Society: Towards a new modernity’, Sage publishing. p.44

“Threats from civilization are bringing about a kind of new “shadow kingdom,” comparable to the realm of the gods and demons in antiquity, which is hidden behind the visible world and threatens human life on their Earth. People no longer correspond today with spirits residing in things but find themselves exposed to “radiation,” ingest “toxic levels,” and are pursued into their very dreams by the anxiety of a “nuclear holocaust” Dangerous, hostile substances lie concealed behind the harmless facades. Everything must be viewed with a double gaze, and can only be correctly understood and judged through this doubling.

The world of the visible must be investigated, relativized with respect to a second reality, only existent in thought and concealed in the world.”

Ulrich Beck (1992) ‘The Risk Society: Towards a new modernity’, Sage publishing, London, pp.72

“In 2008, ArcelorMittal was accused of “whitewashing” millions of tons of toxic waste between 1993 and 2004 through the Belgian company Sollac (Duinkerke). ArcelorMittal sold toxic waste to Sollac under the disguise of fuel for tank ships. A judicial research was conducted for corruption, forgery, use of false equipment and for not declaring exportation of hazardous waste that should have been destroyed to the EU. Other companies involved were Rubis Terminal, SONOLUB and also a retired customs agent.”

S.n., (17 September 2008), ‘Arcelor smokkelde miljoenen tonnen giftig afval naar België’, De Morgen, <https://www.demorgen.be/binnenland/arcelor-smokkelde-miljoenen-tonnen-giftig-afval-naar-belgie-be5aad68/>

“Tetrachlorethylene is the solvent that was used during the dry-cleaning process. Subsequent soil research showed that this solvent pollution has been spreading through the ground water and the sewage system, along the public road and the adjacent residential plots.”

Bert Opgenhaffen & Adu Habtie, (25 januari 2019), ‘Brief aan de bewoners rondom de voormalige was-serij Goossens gelegen aan de F. Coosemansstraat 150 te 2600 Berchem’, Vlabotex.

“The bellow of the soil pollution is mainly situated at the height of the public road (Eikelstraat) and former dry cleaner.”

Bert Opgenhaffen & Adu Habtie, (25 januari 2019),

‘Brief aan de bewoners rondom de voormalige was-serij Goossens gelegen aan de F. Coosemansstraat 150 te 2600 Berchem’, Vlabotex.

“On account of the descriptive research, there seem to be no acute health hazards for the local residents caused by the soil pollution with solvents. It is, however, advised not to pump up the ground water for domestic use or irrigation.”

Bert Opgenhaffen & Adu Habtie, (25 januari 2019), ‘Brief aan de bewoners rondom de voormalige was-serij Goossens gelegen aan de F. Coosemansstraat 150 te 2600 Berchem’, Vlabotex.

“Wasserij Goossens, directed by Groep Goossens nv, owned a dry-cleaning company on the premises of Extra City. They did both cleaning and dry-cleaning. There was also a self-laundry and an ironing service. They started in 1935 and went bankrupt in 2011. The owner sold the company in 2017, but he still owns this building.”

Adinda Van Geystelen, (16 November 2018), E-mail about the soil pollution at Extra City.

“This chemical is absorbed very easily by the living environment: it reaches us through contact via the skin, through consumption of fruits and vegetables that have been grown with soil water, and even by touching the soil and the earth that came in contact with chlorinated hydrocarbons.”

S.n., (s.d.), ‘Wat zijn VOS?’, Vlaamse Milieumaatschappij, <https://www.vmm.be/lucht/vos/wat-zijn-vos>.

Medical Advisory Board on Asbestos Risks 1979

STATEMENTS THAT REQUIRE ANSWERS

1. Asbestos is a highly dangerous material.
It is a carcinogen for which there is no safe lower limit. It has killed and will continue to kill large numbers of people. Many thousands will die.
2. Even a low dose - or working only for a few hours with asbestos - may represent sufficient exposure to be fatal.
3. There is asbestos everywhere : in the home; in the streets; in offices; in work places. So everyone is at risk.
4. The public is at risk from asbestos liberated from asbestos building materials and brake linings.
5. The amount of asbestos found in people’s lungs today is higher than it was in 1949 and is apparently increasing. Even if the amount is insignificant today, sooner or later it will not be.
6. Because of the subtle nature of cancers, the difficulties of diagnosis, and other factors, many more people die from asbestos exposure than we think.
7. It is dangerous to work in asbestos plants.
8. Asbestos should be banned. It can easily be replaced.
9. Blue is a special danger.
10. Families of workers are at risk.
11. Drinking water is contaminated by asbestos cement pipes.
12. Industry measuring methods and figures do not report the very fine fibres which are invisible in the light microscope and are the most dangerous.

“I am fully aware that one of the major industry fears with regard to providing employees with facts on asbestos-health is that this would result in a great increase in workman’s compensation claims. While there may be some validity in this argument, think for a moment how many claims there would be if the IUD and Dr. Selikoff were permitted to present their estimate of the health situation to employees without any refutation by the industry. (...) Hopefully, the employees will come to the conclusion that if the industry is willing to tell them what the law requires, the industry is, in fact, planning to obey the law.”

Matthew M. Swetonic, (October 24, 1972), Executive Secretary Asbestos Information Association/North America

“When asbestos was being used in many buildings, and even in daily household items, or even as fake snow on Christmas trees, people knew nothing about its health hazards. More even, they called it the “magic mineral”, because it was cheap and could be used in everything, and was very fire-proof. Now, it is one of the most well-known silent killers. Asbestos in all forms and kinds and variations, causes lung cancer, mesothelioma, larynx cancer, ovary cancer and asbestose (lung fibrosis).”

Testimonials; S.n., (s.d.), “Asbest en uw gezondheid”, OVAM, <https://www.ovam.be/asbest-en-uw-gezondheid#ziektes>.

“In the past, some Etex companies regrettably used asbestos as a raw material. (...) Given the long latency of some of these diseases, we will remain exposed to this risk in the medium term.”

Etex Annual Report, (2017), ‘Building on from a strong foundation’, ETEX, p. 29

“Despite all that is known about the dangers of asbestos, annual world production remains at over 2 million tons. Russia is now the leading producer of asbestos worldwide, followed by China, Brazil, Kazakhstan, and Canada. In 2008, these countries accounted for 96% of the world production of asbestos (USGS 2008).”

Linda Reinstein, (17 July 2012), E-mail to the Supreme Court of Pakistan and Chief Justice Iftikhar Muhammad Chowdhry.

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Bellini & Eileen Quinn, Don't Follow the Wind, Jessika Khazrik, Daniel Lambo,
Hira Nabi, Franziska Pierwoss, Natascha Sadr Haghighian & Ashkan Sepahvand, Neda
Saeedi, Susan Schuppli, Adrien Tirtiaux and Various Artists

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