Workshop: Filtering Legacies – Filtering Wasted Environments

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Abstract Booklet

Workshop Description

Filtering Technologies are at the center of many current processes of our transformational age as they can alleviate the impact of industrial societies in their planetary dimension. We understand the process of filtering as a scalable environing technique that differentiates and maintains symbolic and material environments alike. Filtering is a process that matters in a twofold way: It is a material process and a symbolic activity. Applying filters means negotiating between the wanted and the unwanted, between the polluted and the untouched environment, and between what is considered dangerous or safe.

Yet filters themselves produce and accumulate wastes of condensed toxicity that are in desperate need of a sink. At the same time, many sinks from past have not been able to contain the wastes they were supposed to contain. Alternatively, imaginaries of a "natural", harmless dissolution of hazardous residues through soil, water or air have proven to be elusive. The persistence of toxicity and toxic residues highlights the fundamental asymmetry and irreversibility inherent in most filtering processes.

This workshop will analyze the interconnectedness of environment, filtering technologies and waste legacies in its historical dimension and explore how hazardous waste has been a target as well as a result of human filtering activities. The workshop aims for a better understanding of the ecologic economy of wastes, sinks and waste legacies which resulted from the hope to unmake the adverse byproducts of filtering activities. What have been the challenges and pitfalls of the past – and what can we learn for the future design and technology of filters?

Session 1

Simone Müller (Rachel Carson Center)

Contested Boundaries of Hazardous Waste. Filter Technologies and the Controversy on Waste Incineration in 1980s USA from a Global Perspective

Waste had become an ubiquitous problem in the United States in the 1980s. Waste-to-energy incineration seemingly its panacea. All across the country, both cities and rural areas remodeled their waste disposal systems to include waste incinerators buying into the promise that this waste reduction would alleviate the pressure from ever growing mounds of municipal solid waste. By the end of the decade, however, this new waste disposal system became caught up in a national and international debate on the hazardousness of waste products from incineration. Canadian communities complained about noxious clouds moving their way seemingly unfiltered from the chimneys. Caribbean and Central American nations expressed their concern over PCBs and dioxins in US incinerator ashes that they had bought as land-fill material. Filter technologies became key in both scientific and public debates circling around the question of where to set the boundary between hazardousness and purity, different thresholds for toxicity, or tolerable doses of environmental exposure.

Manuel Harms (TU Dresden)

The 'Reverse' and 'Productive' Toxicity of Antimicrobial Resistance

Building on ongoing ethnographic fieldwork in urban and peri-urban India, this paper assesses local(ized) approaches and strategies in dealing with the situated ecologies of Antimicrobial resistance (AMR) as a multi-scalar, multispecies phenomenon. The primary focus is on antibiotic use in informal medical treatment and animal husbandry, in order to develop an understanding of how AMR is propagated (or not) by the interplay of human actors, non-human hosts and inanimate matter. AMR challenges our understanding of toxicity in numerous ways. Firstly, AMR operates as a 'reverse toxicity': resistant microbes are (more) 'toxic' to humans only after they have developed resistance to the toxins that were originally created to be used against them. Further, the toxicity of AMR is 'productive': it is a living, mutating assemblage consisting not only of the enzymes that trigger the actual resistances, but also of all the actors that stimulate and world it. Production is also a theme in the manufacturing of such toxins (antibiotics), which often amounts to severe environmental pollution surrounding pharmaceutical plants. This is especially the case in the 'Global South', where outsourcing environmental hazards to (post-/neo-)colonial spaces is a well-researched phenomenon. Although people living nearby and downstream such production facilities are most directly affected, an eventual global spread is virtually unavoidable – strategies of control, such as dilution or filtering work only in a limited manner, and it is very difficult to predict the potential emergence of resistance and its subsequent mobility/proliferation. This is also due to the epistemological issue that resistance becomes only visible when its host organism is attacked. The aim of the paper is to shed light on cyclical processes that expedite or slow down the development of AMR, as well as to develop the ideas of 'reverse' and 'productive' toxicity, not only conceptually, but as an analytical category.

Session 2

Elena Kunadt (TU Berlin)

Technische Lösung oder Anwendungsverbot: Lässt sich Atrazin aus dem Wasser filtern?

In den 1950er Jahren war die steigende Wasserverschmutzung ein kritisch diskutiertes Thema in unterschiedlichen Fachwissenschaften ebenso wie in der westdeutschen Politik. Neben den organischen Abfallstoffen aus den Haushalten und Industrien konnte die Wasseranalytik nun auch Rückstände von Pflanzenschutzmitteln in Oberflächen- und Grundwasser messen. Atrazin, ein herbizider Wirkstoff, der seit 1959 für die Gleisbereinigung und die Unkrautbekämpfung im Maisanbau verwendet wurde, konnte bereits seit den späten 1960er Jahren in westdeutschen Gewässern nachgewiesen werden. Die Funde im Grundwasser wirkten auf einige Akteure durchaus überraschend, da die Entwickler des Herbizids grundsätzlich davon ausgingen, dass der Boden eine ausreichende „Filtrationswirkung" besaß und dadurch eine natürliche Barriere zum Grundwasser darstellte. Atrazin erwies sich jedoch als relativ persistent und wurde schließlich über den Boden in das Grundwasser und mit diesem in die Wasserwerke transportiert. Dort mussten die Betreibenden dafür sorgen, dass das Wasser, was sie in die kommunalen Leitungen einspeisten, den gesetzlichen Anforderungen für Trinkwasser entsprach. Doch der 1980 in der Europäischen Trinkwasserrichtlinie festgesetzte Grenzwert von 0,1µg/l für einzelne Pflanzenschutzmittelwirkstoffe und 0,5µg/l für die Summe aller Pestizide wurde von etlichen Wasserwerken überschritten. Neun Jahre zögerte die Bundesregierung die strafrechtliche Verfolgung des EG-Grenzwertes hinaus, da sie befürchtete, dass zahlreiche Wasserwerke schließen müssten, weil sie den Grenzwert nicht einhalten konnten. Gleichzeitig führten die Atrazin-Anwender:innen umfangreiche Maßnahmen durch, um die Emissionen zu reduzieren. Doch selbst mit verringerten Aufwandmengen und einem Anwendungsstopp auf Bahngleisen ab 1985 tauchten weiterhin Atrazinrückstände im Rohwasser auf. Die weitere Nutzung Atrazins stand der kapitalintensiven Aufrüstung von Aktivkohlefilterstufen in den Wasserwerken gegenüber. Unter anderem aufgrund des Drucks der Wasserwerksbetreibenden, die die Filter nicht unterhalten konnten, verbot die Bundesregierung schließlich die Anwendung Atrazins. Anhand der Geschichte Atrazins kann der Abwägungsprozess zwischen Ursachenbekämpfung und Symptombehandlung im Umgang mit wassergefährdenden Stoffen dargestellt werden. Die hohen Kosten, um Atrazin aus dem Wasser zu filtern, stellten letztlich die Anwendung des persistenten Mittels in Frage.

Paulina Grebenstein (urban:eden lab)
Urbane Naturfilter

Dichte urbane Räume verursachen diverse Formen von Emissionen durch Faktoren wie Bebauung, Versiegelung, Verkehr, Produktion, Heizung, Müll oder Abwasser. Hinzu kommen die durch die Klimakrise vermehrt auftretenden Extremwetterereignisse wie Starkregen und Hitzewellen. Unter den Folgen der Luftverschmutzung, urbanen Hitzeinseln und Überflutungen leidet jedoch nicht nur die Stadtbevölkerung, sondern auch die urbane Flora und Fauna. Blau- Grüne Infrastrukturen fungieren im urbanen Metabolismus als Filter, Umwandler und erzeugende Agenten zugleich, um diesen Effekten entgegenzuwirken. Mögliche Szenarien der Ausgestaltung und Anwendung wurden in zwei Design Projekten exemplarisch untersucht. Das Projekt ‘urban:eden’ kombiniert Blau-Grüne mit Grauen Infrastrukturen, um Regenwasser dezentral zu bewirtschaften und das Überlaufen der Mischwasserkanalisation in die Berliner Gewässer zu verhindern. Im Straßenraum wird dies durch die Kombination aus Mulden- Retention, Urban-Wetlands, permeablen Bürgersteigen und Flutwasserradwegen ermöglicht, letztere leiten das überschüssige Regenwasser direkt zu schwimmenden Naturfilteranlagen in den Gewässern. In diesem verbundenen System können zum einen auf mechanische Art Feststoffe in den Flutwasserradwegen gefiltert werden und zum anderen die im Regenwasser enthaltenen organischen Verbindungen und Nähr- sowie Giftstoffe durch biochemische Prozesse in den Urban Wetlands und schwimmenden Naturfiltern dem Wasser entzogen werden. Das zweite Projekt untersucht wie Städte, durch das Schaffen von urbanen dichten Waldgefügen, permeabler und lebenswerter für mehr

Spezies als den Mensch gestaltet werden können. Genutzt wurde hier die Miyawaki Methode. Dabei werden in kurzer Zeit Mikroökosysteme gebildet, welche Synergieeffekte für die Bedürfnisse von Bäumen, für die Biodiversität, Wasserrückhaltung, Mikroklima und Aufenthaltsqualität bilden. Diese kleinen urbanen Wälder setzen sich aus unterschiedlichen Bäumen, Pflanzen, Pilznetzwerken, Flechten, Tieren und Bodenlebewesen zusammen, welche alle als Agenzien der Filtration und Umwandlung von Stoffen dienen. Das gilt vom Blatt des Baumes das Co2 aufnimmt, Feinstaub aus der Luft filtert und durch Evapotranspiration die Umgebung kühlt bis zu den Mykorrhiza-Netzwerken, die schädliche Stoffe im Boden und Wasser umwandeln und als Nährstoffe an die Pflanzen abgeben. In beiden Projekten werden selbstregulierende nachwachsende Naturfiltersysteme in die Gestaltung des urbanen Raumes integriert, wodurch eine höhere Lebensqualität und mehr Raum für Interspezies-Cohabitation geschaffen wird.

Keynote

Verena Winiwarter (BOKU)
Technologically Enhanced Naturally Occurring Radioactive Materials: A Borderline Case

According to one estimate, global sale of chemicals has increased by a factor of about 25 since 1970, from $171 billion to $4.1 trillion (UNEP, 2013). Over the next few decades, the rate of increase in the volume of chemicals used worldwide is expected to continue, or even accelerate (UNEP, 2013). Regulation of synthetic chemicals is necessary and in many countries, a tight regulatory framework is in place. REACH, the framework of the EU for chemicals has been heralded as a milestone of regulation. The IAEA acts as a regulatory body for radionuclides, and while sometimes being criticized for its pro-nuclear stance, has done well in terms of regulation and tracing of the material from reactors, research institutions and the military. All these materials have one thing in common: They are man-made. But what about naturally occurring radioactive materials that are "technologically enhanced"? How is regulation possible in such cases? The Radium-laden ion exchange resins resulting from removing Radium from drinking water sources are much more concentrated and hence, radioactive, but still, naturally occurring. Their safe disposal is a challenge. The same is true for the radioactive cocktail found clogging the pipes of fracking operations. As long as the material was naturally occurring deep in the earth, it was no bother. But once concentrated and brought to the light of day it presents a borderline case. The presentation aims to use the borderline case of TENORMs as a lens through which to view the greater question of human interventions into natural systems and their consequences for society.

Session 3

Khashayar Razghandi (ExC MOA)

Rethinking Filter: An Interdisciplinary Inquiry into Typology and Concept of Filter

This work aims to re-investigate different aspects of a variety of filters and filtration processes within diverse realms of knowledge from an interdisciplinary point of view, and develops a comprehensive Active Model of Filter that accommodates the phenomena in its entire diversity and complexity. The Active Filter Model proposes to take Filter—from various fields and scales operating at material and symbolic level—not as mere objects, but as difference-producing phenomena that need to be addressed as complex active systems within event-based boundaries. The model underlines a systemic, operative, performative, and negentropic nature to the phenomena that invites one to; recognize various elements and intra-actions within a filter system; follow chains of operations and processes that render the activity; take the performative and ecology building aspect of the filter activity into consideration; and acknowledge the negentropic, order-producing nature of filtering phenomena. The Active Filter Model is meant to serve as a foundation for further analysis and synthesis in various fields dealing with Filter, and the research approach is put forward as a paradigm for how seemingly disciplinary concepts such as Filter can be rethought through interdisciplinary methods, and mutually complement research questions within active matter, biology, information philosophy, data science and sustainability discourses.

Léa Perraudin (ExC MOA)

Leakage and Accumulation. A Field Test for Environing

As an exceptional geo-environmental site of investigation, the elemental politics of Venice resonate with the vulnerabilities of its water-land continuum. The talk contextualizes my recent interventions in tracing and queering the aquatic specificity of the Venetian Lagoon, conducted during the Anthropocene Campus Venice "Water Politics in the Age of the Anthropocene" in October 2021. The mutualities of exposure and concealment, flow and contamination, supply and disposal present themselves as particular possibilities of co-livability in extreme environmental conditions. I will tackle questions of leakage and accumulation that traverse the distinction between fluid and solid, stable grounds and vulnerable territory, local practices and planetary urgency and ultimately touristic collisions of scenic views and abject realities.

Session 4

Sabine Loewe-Hannatzsch (TU Freiberg)

Waste Legacies of Uranium Ore Mining by the SAG/SDAG Wismut, 1946 – 1991

Between 1946 and 1990, the joint Soviet-East German stock company SDAG Wismut produced about 217.000 tons of uranium for Moscow and its nuclear weapons program. The uranium exploitation in East Germany did not consider special safety measures necessary to prevent radiological hazard to the population and environment. Instead, it led to severe air, water and soil pollution as well as the pollution of the biosphere in a very densely populated area.
The milling and mining process left behind an enormous amount of toxic residues in form of waste rock heaps, tailings, settling ponds, polluted water, as well as contaminated equipment and buildings. For example tailings were leaking into soil and groundwater because of a deficient sealing underneath the storage facilities and settling pond. Further, wind erosion blew radioactive dust away from uncovered waste rock heaps. The pollution had two components – heavy metal and radioactivity. Both have a persistence of toxicity that numerous future generations will have to deal with the waste and its consequences. After the termination of mining and milling sites legal provision for proper decommissioning and rehabilitation were necessary and required remediation and recultivation of water, soil, and air underground and on the surface.In 1991 uranium ore mining finally ended in East Germany. In the following years up to today, an enormous financial, technological and scientific commitment took place in order to deal with this environmental disaster and to remediate the wasted landscapes. This again led to the development of new technologies and methods of remediation, recycling and reclamation. However, the development of new technologies and methods to deal with the environmental consequences of uranium ore mining in East Germany did not just begin after the decommissioning of mining and milling sites in 1991. Already, in the 1970s and 1980s the SDAG Wismut developed new methods to cover tailing

ponds and mine dumps, to implement wastewater treatment from leaching and to remediate entire landscapes.

Stefan Guth (Universität Tübingen)

Unfiltered Reality. Facing the Legacies of Uranium Mining and Plutonium Production in Western Kazakhstan

From the late 1950s to the early 1990s, the Soviet atomic ministry sifted through the sandy desert ground of Mangyshlak peninsula in search of fissile materials. In one of the USSR's largest hydrometallurgical plants, uranium, phosphate, rare earths and scandium were separated from the ore. But technocrats' vision of a no-waste economy notwithstanding, liquid radioactive and toxic tailings kept accumulating in the Koshkar-Ata depression in immediate proximity to the city of Shevchenko/Aqtau, eventually forming one of world's largest tailings reservoirs and constituting an urgent threat to the atmosphere and the water of the nearby Caspian Sea. At the same time, a fast breeder reactor in Shevchenko filled its holding basins with plutonium worth hundreds of atomic bombs. Not before 1991 was the general public confronted with the unfiltered truth about these long-lasting legacies of a hitherto classified industry. While U.S. non-proliferation efforts eventually relieved the city of its plutonium, various plans to filter or contain the Koshkar-Ata's tailings have never been implemented. Instead, authorities have lately resorted to censoring discussions on the topic. Apparently, filtering public discourse is cheaper than filtering radioactive wastes.