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Cracking the Surface
Notes from the Editors

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Summary 1 Volumetric Power and the Critical Zones. – 2 Sticking with Holes and their Movements. – 3 On Interdisciplinarity and Multimediality. – 4 Contributions.

During one of the workshops that preface the publication of this special issue, an instructor of a diving school talked us through the history of the Ilse Lake, a former pebble quarry converted in the 1950s into a leisure lake in the vicinity of the University of Augsburg campus. He vividly described the sensations of gliding through the water, breathing down there, and the kind of aquatic flora and fauna we would likely encounter at different depths – or zones – in, near, and around one of Germany's largest underwater diving platforms. At Ilse Lake, diving was a specifically eco-friendly proud spot where divers had vowed not to touch anything underwater, let alone stir up sediments of the lake floor. Meanwhile, divers had to be prepared for an encounter with Igor, a one-and-a-half meter-long male sturgeon, that had been rewilded from a private pond. Because Igor had grown up with humans, so the instructor, he liked to befriend the divers, sometimes settling on their backs for a ride in the underwater world.[1]

During our visit, we were not planning to dive into the Ilse Lake. At most some wet a fingertip or palm. From the solid, dry, ground the encounter with the underworld became most palpable when observing the specialised gear, the divers were equipped to submerge under the rippled surface of the lake reflecting the early

1 On Lake Ilse diving and Igor see https://tauchbasis-ilsesee.de/.

autumn light. Immersing themselves, the divers carried equipment, heavier, but otherwise very much like the conceptual baggage we were carrying, in order to attempt to compose with and better grasp the movements and interrelationships between, from and across, above and below ground: matters extracted, others dumped, ground that falls, water that rises, divers that delve, pollution that spills and percolates, villages that collapse and buildings that rise. How to write them up together in a way that is mindful both of human and more-than human actors, materials animate and inanimate, and their respective power relationships? 'Cracking the Surface' is a metaphor that resonates deeply with the contributions to this special issue that began from this question and that seeks to reassemble and reassess relationships between above and below ground.

Figure 1 Diver surfaces from Lake Ilse, Königsbrunn, Germany. September 2023. Photo by Livia Cahn

The hosts of the workshop and editors of this special issue, an environmental historian and an environmental anthropologist, did not seek a unison but built on their different, and similar disciplinarily baggage's bringing together two initial provocations. These conceptual questions would then proliferate with the input from the other workshop participants that added to a full reign of the inter- and transdisciplinary Environmental Humanities. Several of the participants of the workshop are authors of this special issue;

others were participants of a second workshop in March 2025 that crystallised as a writing retreat that took place in preparation of this publication. In the end, the issue is compiled with contributions from architects, art historians, anthropologists, cultural theorists, film makers, historians, photographers, and a sound artist.

The first of the opening provocations for the workshop grew from a concern with an overdependence on subsurface resources for above ground life. We sought a conceptual device to untether an above ground that is generally conceptually dealt with as separate from the below ground and as studied by archaeologists and geologists alone. Yet while "a vertical orientation" – and with this a recognition of the underground as a place to study and exploit – "perhaps began in geology" in the mid-nineteenth century, already by the mid-twentieth century "it was an important social perspective in many sciences" (Graf von Hardenberg, Mahony 2020, 64), that helped to produce both vertical territories and imaginaries. A place of darkness, adventure and the unknown, this vertical division has been theorized in the literary studies too (Williams 2008; Girard 2012). But as anthropologist, Richard Irvine points out "to isolate life [above ground] from those geological flows is to distort our understanding of society and humanity" and a little further "life is lived in relation to the geology, not just on top of it, and that through these interactions deep time protrudes into everyday life" (Irvine 2020, 2, 60). Bringing depth to the attention of humanities and social sciences marks geology as more than a technical question. It differs from the underground of what Yusoff calls "White geology", a discipline of a racist, imperialist project with a bent on steering extraction, by erasing the social (Yusoff 2018, 7). Today, several authors from the humanities and social sciences work to "remind us that seeking and producing subterranean knowledge is never neutral" (d'Avignon 2022, 28). Taking this heed the underground needs reconsideration.

The second provocation, that fuelled much discussion during the workshops, stemmed from an epistemic quandary both about the horizontal dominance in the humanities and social sciences and its connection to teleological and modernist surface thinking as proponents of vertical geopolitics / the vertical turn have pointed out (e.g. Braun 2000; Weizman 2007; Bridge 2013; Elden 2013; Billé 2020). In historical writings, for instance, most existing spatial imaginaries are anchored in the horizontal two-dimensionality of the political map. Historians are fixated on categories such as 'East' and 'West' or 'Global North' and 'Global South' and while they work on networks of people, trade, or infrastructure, on states and empires, on social movements and environmental resistance, they "privilege the logic of the topsoil, [...] cartographically-centric, [and] focused on crossing flat space with the eyes fixated on the horizon" (Barak 2009, 187; similarly, Reidy 2017). This implicitly assumes that the

logic of above ground is similar or superior even to the organization of the substrata. When scholars have departed from the surface, they looked up: towards a history of aviation, mountaineering, or to the emergence of high-rise buildings.[2] In environmental humanities, the gaze upwards beyond planet Earth, towards the satellites, has been crucial to understand the globe as a planet, the production of 'Spaceship Earth,' or, in the words of Peter Haff, the creation of the technosphere (Messeri 2017; Höhler 2016; Selcer 2018; Haff 2013). Yet, what we are left with, even with this upward gaze, so Barak, is "an implicit narrative of modernity as equivalent to ascent, not unlike the familiar nineteenth-century notions of progress as ladder one is bound to climb in order to advance" (Barak 2009, 190).

Much like lines of verticality, a diver, ascending to the bottom of a lake, leaves surface life behind, before emerging again, having pierced the so-called horizon twice. But the diver in a lake, unlike a person on solid ground, has far more possibilities than to move up and down, without any props, they can swoop, curve and even move diagonally though the water. Rather than a matter of place and location, of coordinates and territory, divers re-oriented themselves in Ilse Lake as a 'volumetric' entity.

Prompted by this observation, we similarly sought to suspend the downward pull of gravity and the physical limitations humans face when going down and underground with this special issue and to re-orientate our analyses through a perspective that makes a diversity of conceptual movement possible while challenging "the horizontal orientation of most theories of state and corporate power" (d'Avignon 2022, 16). To give depth to the surface, in our collective discussions, we progressively dismissed the vertical as an analytical lens for its incapacity to account for movements: twists, turns, flips, trembles and vibrations.[3] In its stead, we adapted the volumetric perspective (Squire 2017; Billé 2020; Rocha, Snelting 2022). This led us to the possibilities, as this special issue exemplifies, that cracks, holes, or pits – as mines, excavations, pits, or water reservoirs – confer conceptually when accounting, responding, or analysing the existential threats to our collective conditions of existence on this planet.

2 On this sky-facing history see Ortlepp 2017; Bradford Landau, Condit 1999; Hallion 2003; Taylor III 2010; Hansen 2013.

3 On the compression and stretching of glaciers for instance see Achermann 2020; for trembles see conceptual work on the archipelago in Glissant 1997.

1 Volumetric Power and the Critical Zones

The perpetuated horizontal reading of time and place, as well as the neat horizon that apparently separates the sky from the surface and the underground, the atmosphere from the biosphere, is suspended when paying attention to the movement of matter between and within above and below ground. To do so, this issue takes lead from Bruno Latour's concept of the Critical Zones. The Critical Zones designate a liminal space, several km's long or high respectively, that has been generated over eons of time by various life forms and mediates the exchange of energy, matter and information between the terrestrial and the subsurface realm.

Bruno Latour developed his work on the Critical Zones in a "thought exhibition" entitled *Critical Zones: The Science and Politics of Landing on Earth* held at ZKM in Karlsruhe, May 2020 to January 2022 (ZKM 2020). But the concept initially stems from a group of scientists and geo-chemists working in an interdisciplinary endeavour to focus on the interactions between water, air, rock and soil in a vaguely situated area from the ground water to the top of the tree canopy. This observatory (CZO) was funded by the National Science Foundation in the United States, in 2006. Latour was not himself a member of the observatory. In borrowing the term for the social sciences and humanities, where this issue picks up on it, Latour's proposal is that the physical mishandling of the ground is not disconnected from the conceptualisation of it. This becomes explicit in the work of Ballestero (2019) on how satellite imagery shape embodied understandings of subterranean water worlds and Cahn (2024) on how drill coring form extraction and burial projects. Environmental damage is both a social and conceptual problem and Latour consequently emphasises the work that interdisciplinary contexts, such as our Environmental Humanities endeavour "Cracking the Surface", can do in dissolving the singularity of the 'surface' while holding together epistemological analysis and environmental engagement.

Ultimately, Latour invites us to become critical "critical zonists", scholars that pay attention to flows, exchanges, and movements in "the thin skin of the living earth" and that explore new modes of coexistence between all forms of life (Latour, Weibel 2020, 2). Yet, addressing the flows, exchanges, and movements – the placements and misplacements – of matter from the field of Environmental Humanities is to understand them not only as physical entities, but as ideas and expressions of power (Graham 2004; Elden 2013; Weizman 2002). A growing body of extraction literature, particularly in decolonial perspectives point to the global disparities of the social, and environmental burdens of extraction, directed by changing market demands (Gomez-Barris 2017; Ferdinand 2022; Lessenich 2019). (Post-)colonial histories, geopolitical agendas,

socio-technical projects, economic interests, all participate in determining the movement of matter, the misplacement, replacement and displacements of solids, liquids and gases, toxic, inert, past or ongoing, in all sorts of different directions and at irregular speeds. These in turn have shaped and still do shape bodies of land and violently mark bodies of people in perceivable and sometimes imperceptible ways (Yusoff 2018).

As our contributions illustrate, all Critical Zones are of intense human activity. Re-casting landscapes, creating voids and heaps, redirecting rivers, draining wetlands, and capturing carbon from above or heat from below at unprecedented rates repeat the same gestures: of extraction, and its counterpart: dumping. These approaches frame the irresolvable tension between the environment as a 'resource' to exploit, focusing on its potential value, and the physical materiality of matter and the social cost of its movement.

2 Sticking with Holes and their Movements

Perhaps not surprisingly an interest in the movement of matter implies an omnipresence of holes, be they cracks, cervices, gaps, or pits. The volumetric landscapes of Critical Zones that this issue assembles include those marked by craters left by a sink hole, by active and dormant quarries, lakes and lagoons, burial sites for chemicals and carbon. Yet despite their omnipresence and (historical) colourfulness, as Martin Siegler points out, holes often go unnoted. Although often when dealing with extraction their prominence is much more significant than the amount of matter extracted. "Almost every object in our daily lives – from mobile phones to skyscrapers – requires the excavation of holes and the production of 'negative space'" (Siegler 2024, 59). Often these "negative spaces" (Weibel 2021) are far larger than the positive objects obtained from them. Massive heaps of waste and dirt are created in the extraction of comparatively small raw materials (Siegler 2024, 59).

Raw materials above ground, the production of 'negative space' below: their co-constituency demonstrates the cyclical nature of extraction. In fact, extraction is rarely an end point. In *Reciprocal Landscapes* Jane Hutton points out that even when the connection between the place of extraction and consumption are blurred by the absence of a visible trace, the connections are more than binary (Hutton 2019). The example of the history of guano fertilizer, extracted from deposits of seabird excrement from the Chinca islands in Peru is striking because the guano changes the composition of the soil, becoming mineral and then assimilated by plants. The input of nitrogen, phosphate and potassium affects plant growth, but the guano, once applied as fertilizer is not visible and cannot be isolated

again. The guano does not return underground in a neat cycle. It may be removed from the ground in one place and assimilated by the ground, elsewhere. In the case that Hutton unfolds it is assimilated in Central Park. It eats itself.

Moreover, the formal connection between Peru and New York enrolls unequal exchanges based on colonial debt that have shaped these connections. Notably with the forced laborers from Chinese ports that took off where the abolition of slavery in Peru and England left an opening and the labor conditions of the miners in the Chincha islands mid-nineteenth century were particularly tough. The increased value of (fertilized) land can also be extracted again. And this happens sometimes in unexpected ways. Take as a poignant example that deals an increase in value on the back of a depletion: Freshkill, a park that was developed on Staten Island, New York on top of a former landfill site (Taïeb 2019). Or as the Ilse Lake visited during the workshop, that went from being a quarry to a leisure lake, the holes left by extraction can become a resource or an unpredictable ecosystem (Ureta, Flores 2022). In both cases, the competing logics of urbanization and extraction meet in unexpected ways, above a filled-up hole.

Cracks, holes, cervices, or gaps hold together many of the threads that the contributions to this special issue offer. They are all the result of time and movement. They may be made from above or from below, cracks may be intentional: made with handheld tools or large-scale machinery, cracks might be accidental, they can be corporate, artistic, colonial or even pre-colonial, cracks can be overlooked, others are hard to miss. The intention of this special issue is not to characterised them nor to be exhaustive in dealing with cracks, but rather to pluralise. Our contributions illustrate a great variety even of otherwise similar coal pits and demonstrate that even though the underground is prey to ongoing extraction and dumping, it is far from a passive container. The power of the underground persists for example in the difficulty to access it, despite its presence; with its variability, and therefore the impossibility to generalise about its characteristics but also with its capacity to bite back. In one of the pieces, again but differently to the example of guano in Central Park, with the capacity to eat itself ("to gobble great mouthfuls of its own surface" in Müller, this issue).

In many of the contributions of this special issue – in some more explicitly than others – holes are manifest, be they literal or conceptual holes: sink holes, holes in the market, holes in basalt rock that promise to be filled with carbon in the near distant future or others still that have gradually filled with rain and groundwater over time. Sticking with the holes in this context highlights the ever-unfinished work of extraction and its remediation; it also illustrates the ongoing interplay between forces above and below ground. Importantly then, cracks are neither vertical nor horizontal. Nor predicable or stagnant. The Critical Zones is never still and binaries are troubles.

3 On Interdisciplinarity and Multimediality

Compiled with contributions from architects, art historians, anthropologists, cultural theorists, film makers, historians, photographers, sound artists, visual artists, "Cracking the Surface" is an interdisciplinary and multimedial endeavor that studies flows between above and below ground through a volumetric lens. Three of the papers bring together more than one author from different disciplines. The discussions raised by the issue are therefore cross disciplinary, as mirrored in the separation between above and below ground that this issue seeks to question, rather than the question of disciplinary boundaries that divide. Herein lies the capacity of this issue to shed light on the constant shaping and reshaping of the surface and its cracks, both rapidly and slowly. They are an invitation to look beyond the cases included here.

The wide range of the contributions from different disciplinary starting points, also offer a wide range of geographical starting points: from small towns and even erased villages, in Germany, to occidental urban and historical centres such as Brussels and Venice; but also, Nairobi and its periphery; a sunny state suburb of the American east coast; the Danish west coast and the digital 'virtual' space of fintech companies. The coal, building materials, urban fabric, chemical residues, ad carbon, are moved by machines, speculation, government led, demand driven, animals, gradual, unexpected or even the result of collapse. Together they depict critical zones that are dense, full of pipes, chemicals, rock, bodies of water, roots, gaps, cracks, demands, protests and workers.

Given that the ground is never neatly sealed, the authors offer ways to grasp movement: following a cormorant, a drop of water, server spaces, open pit mines or building bricks. Be they minuscule or large, the movements are what challenge the usual representations of the ground. Maps the historians work with and sections diagrams the geologists work with do not make these movements tangible, provoking a quest for more suitable modes of representation. In response, this issue is full of multimediality: images, also a sound piece and an animation that were proposed by the authors for this issue.

This propositional approach of working though different media is a starting point, not an end point. It seeks dialogue and discussion. This again rejoins the critical zonists in their question of how to handle the environment conceptually when it is being so massively mishandled by politics of extraction, dumping, draining, and pumping. Latour's work on the Critical Zones puts an emphasis on the double characteristic of the Critical Zone. It is at once unambiguous and approximate. As such, it has the quality of an oxymoron. It has the impetus of an urgent cry for attention to the planetary 'critical' fragility, all while remaining explicitly vague about the precise location of the 'zone'

(Latour, Wiebel 2020, 2). The juxtaposition of the two, highlights a binary quality in constant resonance. But 'critical' also has the vocation to question already established knowledge practices. The conceptual work therefore cannot be separated from the practical workings of underground mines, burial sites and sink holes and the proposal to bring together different disciplinary and methodological engagements with the movement of matter, seeks to bridge this gap, again and again.

4 Contributions

"Notes from the Demolition Edge" by cultural theorist, Kris Decker, is a first-person account that opens the special issue with a piece about a heavily mediatised climate protest against the expansion of a coal mine in the west of Germany where the village of Lüzerath once stood. Getting stuck in the mud with activists the author reports on the epistemological impossibility of relating a field site in writing. This is especially poignant and urgent when the place being described no longer exists, physically. What persists are the memories, the activists, the bigger picture of climate politics, some field notes. By astutely piecing together the bigger picture of the movement against the speed expansion of the mine, this text consolidates what it takes to write *up* the burial of a village. Observing a site from the precipice of a crater that has swallowed up Lüzerath, leads the author to slow down and dissects the habitual gestures of fieldwork to the point of irrecognition. This attempt to make sense of what comes up and what goes down, and what resists this vertical tug in the face of the bucket wheel excavator. Decker begs the question of what might eventually halt this excavator, the heaviest land-based vehicle ever built, a continuous digging machine that surface mines lignite. In this way Deckers work seems to join the protest.

"Thinking with Gaps between Coal and Post Coal in an Eastern German Mining District" by anthropologist Felix Schiedlowski begins precisely in a contrasting context in which mining of coal – at the other end of Germany – is destined to stop. This imminent interruption of the principal industry in the region is conceptualised as a temporal gap, embracing the spatial gap left in the landscape by close to a century of extraction. The linearity of both time and landscapes are disrupted and disoriented by the extractive industry and its encroaching end. Besides the precipice of another crater that is evoked in this piece, this article focuses on the many gaps in the landscape, both present and absent, and all the results of mining coal and its consequences in Profen and in Vereinigtes Schleenhain, in the east of Germany. The former open cast pits and the sinkholes the mining gives way to remain either open, overgrown, back filled

with mining waste or filled with water until they become lakes. The historical moment of transition in which this piece is situated grants gaps their political quality. They are not static, there is always space for change and movement, making space for conceptual analysis too. Gaps are good for thinking through, but this is not without far reaching consequences. These are not easily resolved gaps. Temporally, the beginning of the end of coal extraction is marked by German reunification, but the absolute end of coal extraction remains an enigma that enrols, commissions, funds, discussions about climate change and plans for an energy transition, the loss of jobs and homes. Though the piece begins with holes it doesn't get stuck in them.

The holes get even more unpredictable in Simone M. Müller's contribution "When the Ground Drops. Sinkholes and Scales in History". One sinkhole in particular is at the epicentre of this contribution. In Winter Park, a suburb of Orlando, Florida at 4 am in 1981 the earth gave way. The historical piece retraces how a sink hole, 107 meter wide and 30 meters deep, made headline local news at the time for the damage it caused. Into its vast diameter, the hole drew in a house, and the rear part of a car repair shop. The event triggers the formation of a Sinkhole science, institute and database in Florida. Dramatic as it is, the event, marks a turning point, but the author argues: it is not a one off. By focusing on the interplay between the above ground pressures of heavy urbanisation and extensive ground water extraction that weigh on the voids of the karstic environment that characterise the area, the sink hole reveals itself as particularly eloquent in articulating a dangerous liaison between the above and below ground in Winter Park and this not without engaging with expressions of environmental injustices. The conclusions can therefore be read as far reaching in the conceptual work of grasping scales of time, place and space, volumetrically. The geological event of significant magnitude comes to light as a geo-social formation of the Anthropocene that Clark and Yussof (2017) have described as opening up a deeper understanding of social worlds *and* geological strata.

Geological interest in the underground is also not isolated in "Excavation / Elevation: Above and below ground in Nairobi" by Constance Smith and James Muriuki. This collaborative piece by an anthropologist and a photographer depicts with words and writes with images on the cultures of construction in the context of urban transformation in Nairobi. These transformations are more than double, building up requires a digging down to cut the stone for constructions but what is built up also comes down when buildings collapse and host new urban ecologies. All of these movements are particularly acute in a city that is rapidly being developed by land speculation projects. These underpin the new high-rise skyline and their low-rise quarry pit counterparts. The hast to develop urban

fabric gives way to new architectures but also new fragilities: constructions stall, cracks emerge, buildings topple. These two tendencies fit neatly in the picture of Anthropocene as an accelerated human led geological force that modifies mineral horizons. But the Anthropocene is not only about rocks and humans in this piece. Smith and Muriki's collaboration also makes way for the more than human and the in-between and fleeting moments that do not necessarily make it into the geological record.

"Sensing a Lagoon: Distance, Care and Cormorants", Noemi Quagliati's contribution to the special issue, takes a deeper dive into multispecies thinking with the wings of a cormorant. The world-famous Venetian Lagoon, inhabited by a population of cormorants, comes to light in this piece as a fragile ecosystem. The lagoonscapes fragility enrols remote sensing technologies that the author proposes to view as harnessing attachments, rather than hostile and detached view from above to monitor and manage the bodies of water in Venice. Of all the movements a lagoon invites – of winds, of tides, of boats, of land masses, of rising sea levels and of tourists, the cormorants guide the way with their mastery of the sun cycle and the wind, the lagoon and its above and below water infrastructure. The ripple effects of the bird's incursion into the watery world are many: cormorants are known to be culled on fish farms, despite being a protected species, they are misunderstood as an invasive species and at best as a nuisance by many. Historically, the cormorant is symbolically negatively loaded and yet surprisingly then, they are used as a symbol of resistance against extractive tourism on contemporary posters. This array of relations to the cormorant is topped off by the authors' decision to make of this bird their conceptual guide. Cormorants' necessity to break the surface of the water to search for food, make concrete the connections between above and below that are central to this special issue and thereby unmake the conceptual divide between surface and subsurface that persist in dichotomous interpretations of the environment as seen either from above or from below. And furthermore, although these birds' behaviours conflict with some human interests, in this piece they invite a welcome oblique stance on the truly vertical: a cormorant-vertical instead!

Making a jump from a body of water to ground water to crack the surface, "Subterranean Reverberations and the Horror of the Chemical Sublime" by Caroline Ektanker focuses on the ongoing chemical presence in the industrial twin-town of Bitterfeld-Wolfen in former East Germany. The author sets the scene: former mining pits have been filled to form lakes and in the backdrop factory chimneys have been removed. The result is a visual erasing of the history of mining and the Agfa chemical plant that came to replace the coal industry in Bitterfeld-Wolfen. But this erasure is only skin deep. The connection with the industrial past lies low and is surfaced from the

watery underground by the author who lends special attention to what a buried soundscape can tell that a visible landscape cannot. The proposal of this piece is to invert the hierarchy of the senses: sound before sight. Sound is rendered capable of making connections between the above and the below ground where the visual cannot. An even more heightened sense of sound is granted by working with a sound engineer and contact microphones to reveal the invisible but relentless sound of the workings of a pumping system that was installed to connect wells and filtration units to attempt to remediate the ground water. The industrial past is far from erased from below the surface where remediation remains unfinished, the pollution uncontained. A complex system of pumps churn on. The humm, the hiss, the vibrations captured, whisper the lasting legacy of pollution and the fiction of containing it. The concept of 'transmediation' is mobilized by the author to contrast the remediation attempts on site. The change in prefix signals a shift towards the impossibility of a return to a prior state of purity, a constant state of movement. In this piece it is precisely the microscopes that capture sounds have the capacity to evoke the movement of water and the accumulation of chemicals it contains. In this way the ground is not only seeped in chemicals but also leaking sounds and stories about past. The focus on the sounds of the pumping system ironically amplifies what is not seen nor heard, what is not resolved by bringing to the fore the ambiguities of remediation, precisely what the system installed claims to achieve. Sound vibrations form relations between subjects and objects, bodies and things and lend themselves to a more subversive critique of global networks of extraction and contamination acting at a scale and rate generally imperceptible to the human senses.

Sound is also central in "Translucence: Some Notations on Sediments, Amber, Toxic Chemicals, and the Possibility of Returns", a two-fold contribution by the duo of historian and anthropologist Sebastian Lundsteen and sound artist Korana Jelača. Readers are invited to listen to a sound piece before, after or while reading to delve deeper into the noises of the underground off the coastal stretch of Denmark. The written piece follows the son of an environmental activist from Harboøre Tange. Bjarne, a 70-something-old, retired fisherman, took on his father's hobby of collecting and polishing amber. They are among many amateurs that glean this translucent 'northern gold' from the beaches. The surface of the amber must be polished for it to shine. The surface in this piece is permeable both to these enigmatic fossils, but also to toxicity. Also a former Cheminova chemical plant is buried in Harboøre Tange since 1962. This pesticide producing plant dumped vast amounts of chemicals underground with ongoing effects. These two submerged entities are of a strikingly different kind. But the translucent quality of amber is reminiscent of the opacity of access to information about the submergence of

the chemical depot too. Bringing together amber and toxicity in this text is also true to Bjarne's father biography. Rav-Aage, became renowned for his work mobilizing fishermen and local communities to protest the presence of the chemical plant. Father like son, Bjarne takes on his father's struggle too. He is involved in signalling the environmental injustices of lasting toxicity of the deposited waste, that much like in Bitterfeld-Wolfen, is far from contained! Amber, like toxins are moved by stormy weather. The stir can surface them, making it more likely to ascertain them. But the coastline like the surface of an unpolished amber, and sounds tell a story about time, existence, desirable and undesirable futures, and pasts.

"Countering Big Tech's Gaps: Queer Porosity and Intra-Solidarity Between Above and Below the Surface" is very much situated in the contemporary now. This is a co-authored piece by Jara Rocha, Helen Pritchard, Femke Snelting, Miriam Aouragh and Seda Gürse that are all members of TITiPI (The Institute of Technology in the Public Interest). TITiPI, that was founded in March 2020, as a temporary institution capable to respond to and resist the "inequitable impact of complex global technology regimes and infrastructures" (Rocha et al., in this issue). This contribution is grounded in queer theory and builds up on 'disobedient action research practices' of the collective in which the authors propose counter narratives of the underground to oppose big tech proponents of carbon dioxide removal technologies that claim to secure big business as usual for multinational corporations. In this written piece, and its accompanying animation made especially for this issue, the focus is on 'gaps' in knowledge and the underground that are exploited by the profit company owned by tech giants Frontier Climate. It is therefore not what is removed but what is placed in 'gaps' in basalt rock, under the subsurface that is in question. In particular, in Nairobi, the Kenyan Rift Valley projected as the New Carbon Valley Park, a carbon capture hub or a concretisation market forces, industries demands and profit margins neo-colonial global relations at work. Tending towards crafting counter imaginaries of the subsurface as a gap to fill, the authors draw on a body of queer poetry in particular. The queer poetics find their way into the textual animation that accompanies the article. Shapes spin, bright colours flash and text scrolls like the lyrics of a song protesting the conquest of the underground for carbon dumping, accompanying the urgent tone of this work.

The picture essay "Rotor: Entangled Matter" is by and about a collective too. Rotor is based in Brussels, Belgium and active in the physical work of salvaging construction material for re-use in an urban context in which office blocks are regally revamped, producing a lot of construction waste. This hands-on engagement with the materiality of construction informs an ongoing conceptual enquiry into the flows of matter. The cycles of where materials come from

and go to are rarely straight forward. A series of telling show cases form the backbone of this piece. They are a selection of a larger series of cases initially put together for an exhibition held at Bozar, in Brussels from October 2024 to January 2025. The images in this piece are in fact screenshots of videos entitled *Transmutation* that were showcased in the exhibition and compiled by Bêka & Lemoine, in collaboration with Rotor in different site of material production, transformation and re(use) in a radius of 200 km around Brussels. These depict how various construction materials enrol people's lives, changing economic interests, and environmental concerns, signalling the specificity of the questions that the materials of our built environments pose. An interest for the particularity of each material and its pathway from the underground, often to return to the underground as waste, is not simply for curiosities sake. Rotor, that is both the subject and author of this exhibition and article, is at the brink between conceptual and technical work that seeks to address the practical adjustments possible and necessary to lessen the environmental burden of the construction industry, responsible for no less than 35% of the EU total waste generation. The selection of three quirky sites of extraction, re-extraction and storage for reuse, give the propositional work that Rotor does an ironic undertone, solutions are never as straightforward as they seem in the messy entanglements of material flows. The crisp images and sharp captions make this very clear.

Side by side and all-in-all, "Cracking the Surface" emerges as encapsulating many different scales, and actors, in diverse contexts, historically, and geographically. The question of what constitutes an appropriate conceptual apparatus to address the depth of a surface sticks to the different terrains the authors' contributions report on. So much cracking renders the surface almost impalpable, and its role as a neat separation between above and below ground is averted. The tree incidentally figures across the contributions: a lone tree, a tree as witness, a tree eaten by a sinkhole, a plantation, and even a lack of trees and a tree-like structure in the Venice lagoon. The tree has a similar capacity to divert attention from the surface, sending roots and foliage into cracks in search for nutrients and light. A little like a diver in a lake that moves across the entire volume of the body water, a tree also does not grow in a single plane. A trees' growth is impacted by the waters it encounters, perhaps they are steeped in chemicals, rising from the water table to fill a former mining pit or sink hole or even water (with carbon) hypothetically injected into quartz rock. In each of the pieces of this special issue, attention to flows – not only of water – highlight that the stakes are often high to demonstrate control over these movements. Some flows should stop, some should start, but some stop and start, and some continue. Control too, is hardly ever clear cut nor neat.

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