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The Psychogeophysics of Bangka Island: On Tin, Mining, and Materiality

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ABSTRACT

In 2018, researchers from the Massachusetts Institute of Technology (MIT), commissioned by the mining corporation Rio Tinto, released the list of metals they expected to be most impacted, in terms of increased demand, by upcoming technologies. Tin ranked highest as the most impacted. Almost one-third of global tin supply is extracted from two islands in the western archipelago of Indonesia, Bangka and Belitung. In this paper, I focus on fieldwork undertaken in Bangka Island and re-examine the materiality of tin and its complex entanglement with humans through psychogeophysics. This involves bringing a creative approach to the practice of the geophysical survey as a method and solo *dérive*. The practice of psychogeophysics seeks to provide an analysis of an island that has been actively mined and geo-transformed for millennia. I begin by exploring the history of tin on Bangka island, then focus on the construction of tin's value and the dynamic relationship between humans, nature, and labour as conceived among different groups of people and issues; an entanglement between small-scale unconventional miners, mining company PT. Timah, the indigenous Orang Lom, and scientists speculating on phytomining in Bangka. The psychogeophysical approach implies a research practice of experiencing and encountering, which seeks to apply a critical epistemological instrument by which to gain knowledge regarding the way in which tin is enmeshed in the geophysical, political, cultural, and technological realm.

KEYWORDS

psychogeophysics, practice research, creative arts, tin metal, materiality

Introduction

[1] Cobalt and lithium are publicly known minerals extracted for making technological apparatuses.

In 2018, researchers from the Massachusetts Institute of Technology, commissioned by the mining corporation Rio Tinto, released the list of metals they expected to be most impacted, in terms of increased demand, by upcoming technologies such as automated vehicles, advanced robotics, renewable energy, energy storage, advanced computation, and the internet of things. Amongst other metals in the list, like cobalt and lithium [1], tin ranked highest as the most impacted. One-third of the global tin supply is extracted mostly from two islands in the western archipelago of Indonesia, Bangka and Belitung. Indonesia is the second largest exporter of tin after China. Tin from Bangka and Belitung mostly circulate globally, whereas tin mined from China is used largely for domestic purposes. Tin is smelted for products including tin ingots, low lead-tin, tin alloys, tin solder and tin chemicals which are each important commodities for mass-producing electronics. Tin solder is a foundational aspect in all electronic components, ranging from laptop and smartphone to digital technology and optoelectronics like liquid crystal displays (LCD).

Since the early 16th century, local community and colonists in both Bangka and Belitung Islands have practiced tin mining. They predominantly extracted tin as a raw material for coins and household tools. Historian Erwiza Erman notes that from the 15th to the 17th century, in religious ceremonies and ritual performances in mainland China, instruments and ornaments made of tin from Bangka and Belitung were abundant (64). Similarly, the Dutch colonial empire in the region treated tin as one of the most important commodities from the south. They used tin as a material for producing containers that carried spices and storage for tea leaves from the south to Europe (Erman 75). Because of its low-melting-point, tin was also a popular metal for brazing. With its melting temperature and capability of conducting an electrical current, tin eventually evolved its function from brazing material to the main resource for soldering, key to the construction of electronic circuits. Sean Cubitt in *Finite Media* writes that the commodification of tin, becoming preferred to lead due to its less hazardous nature, especially for soldering in electrical goods, is a great shift in material culture (73). In her exploration of material extraction sites in the United States, Laurie Palmer stresses that although lead's resistance to corrosion made it a strong metal to conduct electricity, when it contacts with the human body "it cleaves to your cells and tissues in promiscuous bonding, and doesn't go away" (121). As tin usage has evolved, its particular quality as the safest conductor for electrical and digital components positions it as an essential component in the accelerating production of screen-based devices that utilise tin in ever increasing quantities.

In this paper, I use psychogeophysics to examine the materiality of tin on Bangka Island and its complex entanglement with humans. Psychogeophysical methods attempt to overcome the lack of recognition of geophysical properties that make up urban surroundings. In his book *A Geology of Media*, Jussi Parikka states:

This concept [psychogeophysics] and an art practice or a mix of methods is an expansion of the psychogeographical familiar from the Situationist

vocabulary. Psychogeophysics argues that we need to extend beyond the focus on the urban sphere to the geophysical for a more fundamental understanding of the modulation of the subject that is stretched between ecologies of capitalism and those of the earth. (61)

This study aims to investigate the dynamic between the everyday life of human communities and tin (as material) on the island. Through participation in the geophysical surroundings of the research activity, this paper considers tin as a factor of social communication. The method involves bringing a creative approach to geophysical surveys and the solo *dérive*.

Dérive is an aimless drifting practice, or in *Theory of the Dérive* elaborated by Guy Debord as “a technique of rapid passage through varied ambiances” (62). Merlin Coverley extends the definition of *dérive* in *Psychogeography* as “free floating exploration” (29). The aim of performing a *dérive* on the island is to consider the post-mining geophysical structures that the development of media technology has shifted through the exponential growth in demand for tin and its consequent unchecked extraction. Through geological walks, classical *dérive*, experiments, geophysical investigation, and assays, the concept of psychogeophysics is introduced in this research as a complementary term to that of psychogeography associated with the Situationist International (SI) from the 1950s-60s, which implied the study of the effect of urban environments on the psyche of individuals and groups. The London Psychogeophysics Summit Collective in 2010 summed up psychogeophysical practice as a speculative aesthetic for the connection of technology, material, and the human with a special view to the geophysical. However, in this project I extend the method of psychogeophysics from seeing phenomena as physical processes of the earth and an aesthetic perception of the nonorganic to also emphasise the activity of inspecting tin’s active role in shaping Bangka people in relation to the development of media technology. The practice of excursion in this project differs from the techniques or methodologies written about in *A Psychogeophysics Handbook and Reader* which observes the geophysical properties of earth and “its interaction with local spectral ecologies” (5). This practice is more critical when confronted with the problem of ecological mutation on the island, which comprises entanglement of many actants (Latour). In other words, psychogeophysics in this project is understood as a creative instrument to address issues relating to mining and mineral transformation. It is not just an aimless drifting or flaneurial approach, but a performative experiment that includes political gestures toward viewing geophysical shifts and mineral extraction, a creative corollary to what Jane Bennett and Alexander Livingston note as doing “philosophy in the wild” (12), or a practice not only capturing the environment but “activating problems and concepts in the midst of the event” (Springgay and Truman 2007). Furthermore, psychogeophysics practice attempts to give an analytic report of the situation on the island that has been actively mined and geo-transformed for millennia.

Fig. 1 Illegal smelter at Merawang, Bangka Island.



Attention to the study of tin production in Bangka island has influenced historical and anthropological studies of mining via the work of Mary F. Somers Heidhues and Erwiza Erman, especially in relation to ecological facts, post-colonialism, and the global economy. They consider how globalisation studies and the journalistic approach have offered a detailed analysis of the mobility of Bangka's tin production and circulation. As Elizabeth Povinelli writes in *Geontologies*, "a new interdisciplinary literacy is the only hope for finding a way to square our current arrangement of life with the continuation of human and planetary life as such" (36). In what follows, the artistic approach of psychogeophysics practiced on the island puts forward a novel interdisciplinary method of addressing complex trans-relations and transformation between humans, mining, geophysics, and media technology within a geopolitical context.

The paper begins by exploring the history of tin on Bangka island while navigating tin as a vital material. Secondly, the paper focuses on the construction of the value of tin and the dynamic relationship between humans, nature, and labour on the island conceived from different groups of people and their relation to both each other and tin related issues. This is especially relevant in the entanglement between the scale and interests of the stakeholders: state-owned mining company PT. Timah; the unconventional local miners who work on a domestic scale in the wake of PT. Timah; the indigenous Orang Lom who mine literally by hand without the aid of machinery; and scientists, particularly biologists, speculating on phytomining as a means to use plants to absorb tin and then extract it through a harvesting process. Finally, the paper provides a critical reflection upon the *dérive* and geophysical experiment performed in the disused mine in Sungailiat, Bangka.

Bangka Island and Tin

Tin is extracted from both Bangka and Belitung Islands, however, in this paper I focus on fieldwork undertaken in Bangka, which is an island at the northeastern tip of Sumatra, Indonesia. Geophysically, Bangka Island lies on top of granite bedrock. The process of sedimentation occurs as granite that carries cassiterite minerals (SnO_2) decays and erodes as tin ore. The eroded cassiterite sediment contains a high proportion of minerals and accumulates in the rivers, soil, beach and offshore.

Established theory and myth argue that the name of Bangka is taken from the word “*wangka*” which means “*tin*” in Sanskrit. For centuries, tin has been a source of economic stability on Bangka island. The history of tin resonates with the history of social, cultural, and political development of the island. Although there is no empirical evidence indicating when tin was first exploited and extracted on a large scale in Bangka, based on the study conducted by Erman, the earliest found technical object made of pure tin dates from the year 1710, which is a clue that extensive mining may have started to operate even before the 16th century (69).

According to the archive of the Tin Museum on Bangka Island, tin metal was found in the debris of the burned landscape first used by the indigenous people in the first century (AD). Tin ore in the soil melts at 220° C degrees, which is the temperature of fire on the landscape. Burning determines the chemical reaction of the soil that holds tin ore, which then resulted in people finding the new solid silver material. The Tin Museum archive, situated in Bangka, also notes that indigenous people on the Island conceived it as an essential material for heirlooms and accessories, and a means to communicate with the deities. They are said to have believed tin was a gift from the outer world that functions as a communication tool.

The emergence of tin on the island resonates with Anna Tsing’s writings on the multispecies world of pine and fungi, in which these living things take advantage of exposed mineral soil left by the human practice of burning the landscape. For Tsing, “world-making projects can overlap, allowing room for more than one species” (22). From the moment indigenous people on Bangka Island found tin, tin starts its life as what Jane Bennett calls vital material. Bennett’s notion of material vitality proposes a philosophical attempt to rethink the division of matter and life in modern ideas, the latter having the notion that material is a passive and inert stuff (vii). The concept of material vitality is used here to investigate the assemblage of things and how this assemblage structures a complex network of actants, as Bennett further notes:

By “vitality” I mean the capacity of things – edibles, commodities, storms, metals – not only to impede or block the will and designs of humans, but also to act as quasi-agents or forces with trajectories, propensities, or tendencies of their own. (viii)

In the early period of its discovery on the island then, the Orang Lom used tin to reproduce objects that represented their cultural identity. Adornment worn by indigenous people signified their value as cultural beings. Here tin might be

considered not as a commodity with monetary value, but as a material that has a reciprocal relationship with the human, shares human agency, and illustrates its “curious ability ... to animate, to act, to produce effects dramatic and subtle” (Bennett 6).

In contemporary times, the human relationship to tin from Bangka has morphed into that of a commodity with a monetary value, an exploitable resource. Tin now travels around the world, shifting shapes through different phases; from ore in the earth layer, smelted into ingots, and ending up in electronic components as solder that creates our technological subjectivity. Soldering shapes technological advancement, thus, whilst tin can still represent our cultural and technological development in contemporary times, this shape-shifting mechanism started by the practice of extracting and manufacturing the mineral ultimately devalued the agency of tin in Bangka, rendering it into a passive material.

Global consumption of tin and its commodification abstract the mutual dependency between inorganic material and humans. The relationship between tin and humans is black-boxed in the sense that the life of tin, as a geo-entity, is invisible and reduced to “standing-reserve” in the eye of modern technology (Heidegger). That is, tin becomes almost a notional product, traded, commodified, always available without material consequence. Such ideas render humans into unique entities, with a form of life that is “qualitatively different from all other life” (Bennett 86). The technology of soldering has contributed not only to the geological transformation that occurred on the island but also social interaction between inorganic matter and humans. By tracing the connection between tin and its surroundings, we can try to revalue the vitality of tin.

The Value of Tin

In contemporary times, there are two categories of miners that are visible everywhere in Bangka Island: the unconventional miners (*penambang inkonvensional*), and industrial scale mining performed by the state-owned corporation PT. Timah. Unconventional mining is the terminology used to describe local artisanal and small-scale tin mining, which has been increasingly active since the year 2000 (Nurtjahja and Agustina). Artisanal small-scale miners use traditional mining techniques by pouring pressured water over the cassiterite sediment to separate the tin ore. Local middlemen then buy the filtered tin ore and distribute it to smelter companies. Local and international media – with the reference to Indonesian government definitions – brand unconventional mining as an illegal activity despite the fact that this activity has positive economic impact for local communities. Income earned from unconventional mining is fast, meaning it provides prosperous business opportunities for the local community. The practice of unconventional mining emerged sporadically in PT. Timah’s abandoned mine cavity. Bangka’s landscape is marked by disused open-pit mining left by PT. Timah. The unconventional miners mine the cavity in hope to find any secondary ore left in the soil, and they also mine the backyards of their homes, considering that Bangka’s soil contains a variety of kinds of tin ore. Large scale tin mining by

PT. Timah has been undertaken since colonial times. PT. Timah, previously known as Banka Tin Winning Bedrijf, was a colonial Dutch-owned company extracting tin on the island for export to Europe since 1816, before it was nationalised by the Indonesian government in the 1950s (Brown 254).

Fig. 2 Backyard mining at Merawang, Bangka Island.



According to Nurtjahja and Agustina, the practice of unconventional mining began to flourish in 2000, following new regulations issued by the local government that gave permission for locals to mine (817). On the island, the boom of unconventional miners, mineral extraction, and geophysical transformation is visible in the form of myriad craters. This relentless mining of tin as a commodity, now required in seemingly limitless quantity to satisfy consumer technology, yet extracted on an island of finite resources, has altered and continues to alter the landscape of Bangka.

Fig. 3 Disused mine with unconventional miners' hut at Sungailiat, Bangka Island.

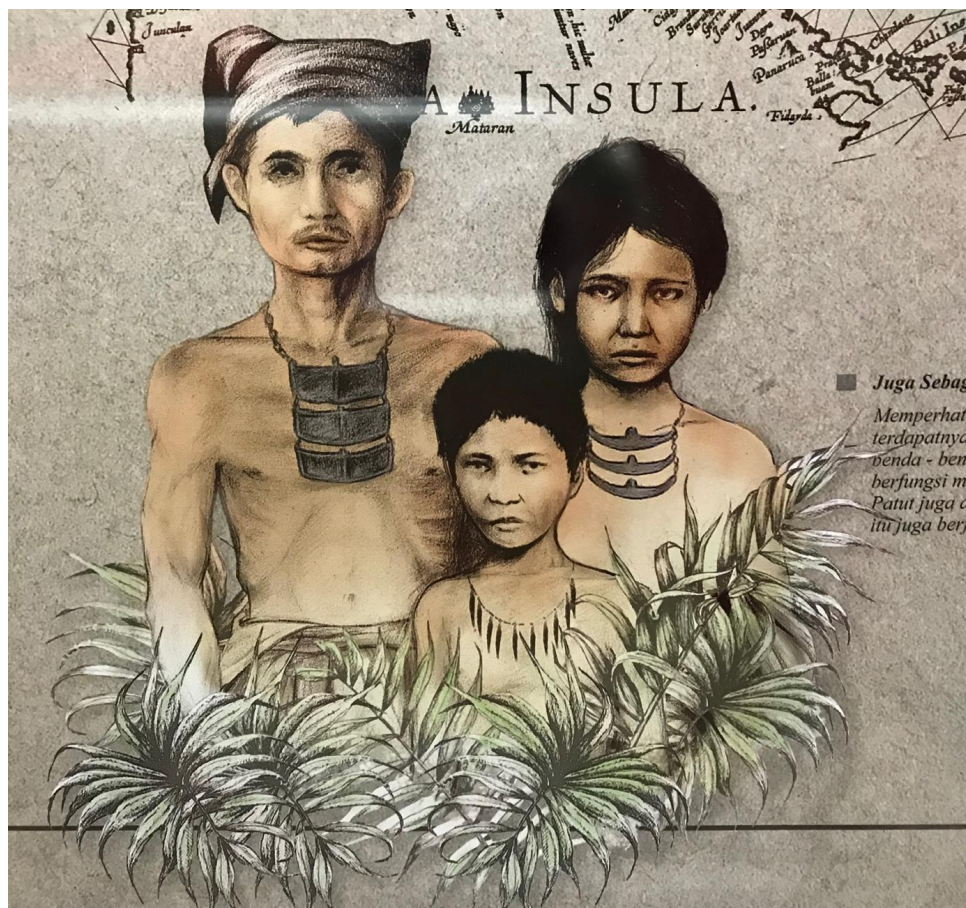


Fig. 4 Geophysical landscape captured while doing a *dérive*. Abandoned mine site at Sungailiat, Bangka Island.



However, for the indigenous people of Bangka island, the stateless Orang Lom, the notion of extraction and exploitation is not the primary objective; for the Orang Lom, tin functioned as a valuable object underpinning a gift economy, contrary to the contemporary market-driven economic system. Although this still involved some extraction and arguably material exploitation, the altogether different scale and purpose rendered it sustainable. Both unconventional miners and PT. Timah conceive tin as an object to master and study as a part of developing cultural advancement. Orang Lom see tin as not merely an inert object but a vibrant matter. They personify the tin object, using it as an heirloom that embodies identity. The practice of anthropomorphising tin is an act that renders tin as a vital object. While the contemporary value of tin objects derives from the human labour that went into producing them (Marx), the embodiment of personality and identity in a tin object made by Orang Lom shows that the mechanism of the gift economy in their cosmology relies on the relations and particular histories that are embedded in the object (Graeber 211). The personification of the tin object pushes the agenda for “thinking beyond the life-matter binary” (Bennett 20). The tin object for Orang Lom functions not merely as a thing for exchange but a manifestation that signifies kinship. The act of giving a tin object as a gift indicates reciprocity and generosity.

Fig. 5 Illustration of Orang Lom displayed at the Tin Museum, Pangkalpinang, Bangka Island.



According to philologist Teungku Deqy, the terminology of Orang Lom that appeared in eighteenth-century Bangka derives from the Malay language, Lom meaning "pre- (before)" and Orang meaning "human" (53). The terminology shows the transformation in society as the concept of being modern, and consequently the denigration of pre-modern, emerged on the island during the colonial period. Through the genealogy of tin's history displayed on the wall of the Tin Museum, one can speculate that the ontology of tin metal gradually shifted, through the arrival of modernity, from the life-giver for the community to a material used to create valuable objects for monetary purposes. Unfortunately, in this project, I did not encounter or talk with anyone that identified themselves as part of Orang Lom society. Therefore, most of the knowledge regarding them is compiled from literature, the museum, and perceptions of Orang Lom people derived from a walking interview with a different group of project participants.

Fig. 6 The collection of Orang Lom's tin objects (human adornment); artefacts displayed at the Tin Museum, Pangkalpinang, Bangka Island.



The Dream of Phytomining

Alongside the active extractivists and indigenous community in the island, the scientific and academic situation in Bangka island is driven by the goal of accelerating the production of tin. Eddy Nurtjahja is a biologist based in Universitas Bangka Belitung who has written extensively on the implication of tin mining on the biodiversity on the island. When we had a walking interview in March 2019, he revealed that one of his recent research projects is to develop phytomining. Phytomining is a process of extracting metal from the soil using “hyperaccumulator plants.” These are plants that are able to absorb tin in soluble form through their root system, the tin is then held in the plant body and can be extracted through a refining process after harvesting the plants. Only a few varieties of natural hyperaccumulators are classified with the capability of absorbing small quantities of heavy metals in the soil. Therefore, for Nurtjahja natural plants are insufficient. In this early development of his research, the aim is to genetically mutate and customise new species of mangrove and tidal plants that foster the emergence of primary tin ore. This research could also result in proposing a species for land remediation. Contrary to the secondary ore abundant in the surface soil layer, primary ore is usually only found in the deep subterranean or hydrothermal veins in granite intrusions. The melting point of primary tin ore is slightly lower with higher electrical conductivity than secondary ore. According to Nurtjahja, if through phytomining, he can realise the new tidal plant species that could extract primary ore, Bangka people, especially the unconventional miners, may benefit. He stressed that it might not only financially benefit the local people, but also remediate the ruins left by large-scale commercial mining.

Nurtjahja's phytomining research project, despite its aims, echoes the early 1990s artistic collaboration between artist Mel Chin and environmental

scientist Rufus Chaney, *Revival Field* (1991). In this experiment, Chin and Chaney tried to find a certain hyperaccumulator plant that could extract lead from the soil in a landfill. They used a variety of *Thlaspi*, which extracted lead from contaminated soil in the Pig's Eye Landfill in Minnesota. Their process was to harvest the plants, incinerate them and analyse the quantity of the heavy metal content. They then recovered and recycled the mineral. The process of phytomining – or in their case phytoremediation or green remediation – in Chin and Chaney's project brought forward the idea of alternative mining practice. The psychogeophysics approach also incorporates an aesthetic which includes the multiple viewpoints and collaborative entanglements of all stakeholders and allows them to be seen as having artistic value.

Despite being relatively small in terms of scale, *Revival Field* optimistically generates a process of extracting a mineral for the second time from the earth. However, for Nurtjahja, contrary to the *Revival Field* project, phytomining is not only practical for recovering the contaminated site, but for the future of tin mining. When asked whether the project could lead to the depletion of tin deposits on the island, he said that he hadn't looked at the global impact of tin mining in regard to geological transformation. Bangka island lies on top of the cassiterite (primary ore) bedrock and thus the finitude of tin on the island is its hourglass. If tin is depleted, then Bangka will be drowned. However, Nurtjahja asserts the idea that while ongoing mining will accelerate flooding on the island, this acceleration of a natural process is justified given potential benefits to local people. Their agency to undertake tin mining is one way to deal with their precarity. This contrasts with environmental activists who assert that all mining practices should be renounced in favour of agriculture. Instead, Nurtjahja argues, locals need more immediate action for their survival, such as the instant results from tin mining.

The process of phytomining, as proposed by Nurtjahja and engaged deeply as phytoremediation through artistic practice by Chin and Chaney, implies the possibility of recycling and remediating metal. However, recycling materials into media technology risks reducing the quality when metals are mixed with another components. If tin is melted for recycling, it can contaminate other metals such as copper and aluminium found in electronic circuits, since tin will degrade when it is smelted with other metals, thereby worsening the ability of tin to conduct electricity. This degradation of recycled material, known as downcycling, means that many technology companies avoid using recycled minerals in order to retain the quality and reputation of their products. However, with phytomining, there is a possibility to filter the amalgamated metal to separate the tin.

Psychogeophysics Practice

During my psychogeophysical *dérive* practice in March 2019, on the abandoned mine site in Sungailiat, Bangka island, the sound of water-pumping machines was amplified to almost every corner of the area. I observed many open spaces and/or unused mines left by PT. Timah, and in these there were groups of people busy digging the soil and filtering the sand in the precarious landscape. Craters filled with brown, turquoise, and green liquid were visible.

Mining activities are ubiquitous here. In my practice of observing the geophysical actuality of the disused mine in the area, I encountered Bang Zul, an unconventional miner who explained to me how his practice yields practically nothing compared with how PT. Timah extract tin. The state-owned company in the last decade started large-scale offshore tin extraction using dredgers, whereas the unconventional miners must dig through the remains of PT. Timah's old mines onshore.

During our walking conversation around the disused mine, Zul stressed that the new model of offshore extraction performed by PT. Timah damages the habitat of marine biota. The offshore dredgers operate by scraping the seabed to explore potential sediment that contains secondary tin ore, creating an excess of sand from the washing process and endangering the coral reef and polluting the quality of sea water. While the company is applying a new method of offshore mining they have decommissioned the depleted onshore mines. In a short period, these onshore unused mines have become "latent commons" (Tsing 135), and they provide a new value to the small amounts of residual tin that unconventional miners extract collectively.

In the destruction perpetrated by the state-owned capitalist extractor, the local unconventional miners enjoy raw minerals they are able to extract from the disused mine, even while the site is contaminated by poisonous excess of mechanical mining practices. This abandoned mining site has become common property but a precarious source for local livelihoods. However, in the circular flows of supply and demand, tin mined by the unconventional miners from the commons still ends up in the same domain as the product of large-scale mining. Collaborative survival performed by the unconventional miners is an alternative to capital progression, but still circulates in the same system with the premise that tin will be used as basic material for technology and media production in the global market. Though the local community financially benefits from common property, the market for tin as raw material for media technology is still centralised and privatised by capitalists and the state, therefore what makes the practice of unconventional miners different from the state-owned company is just their smaller scale of production.

Fig. 7 Encountering Bang Zul, an unconventional miner. The place is a disused mine in Sungailiat, Bangka. From left to right: the author and Bang Zul.

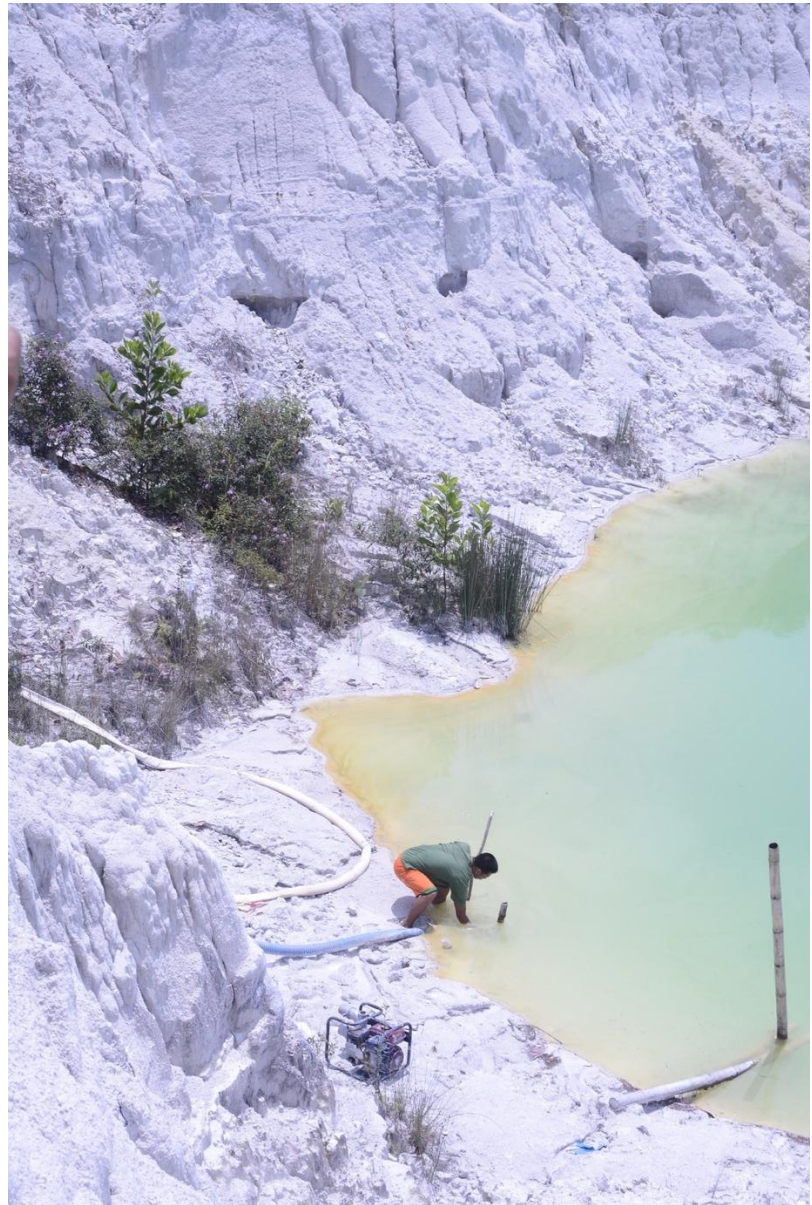


In late March 2019, in the disused mining site in Kolong Biru, in southern Sungailiat, I worked with an unconventional miner Bang Barim to measure the depth of a disused mining crater, in order to calculate the amount of tin deposit left on the site. The depth of the hole can also be understood as the determinant of landscape transformation, as it shows how the geological landscape has been transformed rapidly through mineral extraction and demand for tin. Using DIY technology such as the water pump and plastic hose as a measurement tool, we calculated that the depth of the crater was three metres. These three metres may be taken to represent the dependency of media technology on geological materiality. According to Barim, there is not much tin left if the depth of the hole is over two metres. Barim claimed he could extract around 50 grams of raw tin ore per day if he mined in this site for more than eight hours. Then he would need to practice a non-laboratory assay process to determine the quality of the ore.

According to statistical data on their website, PT. Timah increases the amount of tin mined every year, demonstrating the desire for growth. Such growth is supposedly effected by economising the spheres of mineral extraction while also deregulating the market, as emphasised in the current neoliberal system of governance. The state-owned company thus operates like other large-scale mining operations in its financialisation of the mineral. By extracting massive reserves of tin deposits, it will increase the value of this mineral in the market. As we gradually ignore the realities of mining when we consume the incoming media technologies (including so-called green technology for renewable energy consumption), the value of tin is lost in the demand for it. Tin loses its materiality and transforms into an object for which speculation by traders transforms it into pure exchange. It becomes an instrument for a financial derivative, which is then mutated into a data form for financial operation (Cubitt 79). Ironically, this financial operation runs automatically using high-frequency trading algorithms run on a supercomputer that relies upon the act of extracting minerals. Financial speculation shapes the material of tin in the

global financial market. The practice of extractivism reconstructs itself to what Cubitt terms “datafication.”

Fig. 8 Bang Barim using jet pump and plastic hose as a DIY instrument to measure the depth of the crater.



The connection between extraction and labour in terms of scale became visible through the psychogeophysics practice that was collaboratively performed between me and Barim. Our form of psychogeophysics fostered our physical relation to the site and in doing so enabled us to more deeply understand the relation between geophysical transformation, the notion of latent commons, and mining. The physical engagement performed by researching the depth of a crater offers a speculative survey that generates a new inspection into the understanding of the tension between mineral extraction, scale, and local miners.

Fig. 9 Secondary tin ore found in the soil while measuring the crater with Barim.



Conclusion

Povinelli writes that capitalism bears a unique relationship toward material in which “everything is vital from the view of capitalization” (20). Bennett and Livingston also assert that capitalism perceives the vitality of things. According to these authors, if we recognise the active role of material, we also must “counter the idea of vitality that is also at work in the neoliberal, capitalist practice of endless economic ‘growth’” (13). Through artistic means, this paper has examined the genealogy of media technology, dissecting it to trace the materiality of tin. With the implication of experiencing and encountering, the psychogeophysical approach has sought to become a critical epistemological instrument in gaining knowledge regarding the enmeshment of tin in the geophysical, political, cultural, and technological realm. In using Bangka island as a case study, I have sought to demonstrate how the relationship between mineral extraction and media technology transforms the geological formation of the island. Furthermore, it is humans, through their mining practice, that may accelerate the process of ecological shifts and outperform natural processes [2]. This current geological epoch overvalues the human and devalues the agency of tin, especially in Bangka island.

[2] This geological epoch termed by Paul Crutzen as the Anthropocene; as he elaborates, it “is more than appropriate to emphasise the central role of mankind [sic] in geology and ecology by using the term “Anthropocene” for the current geological epoch” (16).

The massive production of media technology conceals the connection between materiality and the “tendency of forces to form agentic assemblages” (Bennett 53). Geological transformation is made invisible by the mode of obsolescence in producing media technology. However, through the *dérive* and walking interview, one can approach the invisibility of tin’s vitality through the labour dynamic on the island. Each different group encountered conceived of tin through the value it gives to their life, whether as a commodity, cultural object, or data. Though unpredictable, scientists on the island propose the idea of phytomining in order to accelerate ecological shifts while remediating the effects of mineral extraction on the island. The commodification of tin eliminates the vitality and collaborative potential that could emerge on the island through latent commons. Commons property like disused mines might

provide an alternative circulation for tin, however, the precarity of life on the island pushes the unconventional miners to rely on the market economy while the alternative idea of gift economy inspired by the cosmology of Orang Lom is largely forgotten. The *dérive* and geophysical measurements prove the alteration of the landscape and the complex relationship between humans and nature in Bangka island.

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