

Minerals as Keepers of Time

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Introduction

Society is increasingly depending on advanced technology. Especially during the last decade, our understanding of the Anthropocene, the proposed geological time in which human activity has a significant impact on the planet's climate and ecosystems, has expanded to include the minerals needed for the production of digital devices, the storage of data, and computing infrastructures. The increasing development, testing, and use of artificial intelligence (AI) has accelerated mineral consumption. There is tension between the needs of the new wave of AI and the proponents of digital degrowth, who propose reducing technology consumption because, among others, of the unsustainable impact of mineral mining. For instance, as one of the first countries in the world, Norway has approved the deep-sea mining of minerals needed for the so-called twin transition, the digital and energy transitions. Deep sea mining will result in significant harm to marine life. How do we create awareness of the unsustainable mining of minerals? This paper proposes a focus on time to cast light on the effects of human overconsumption. Minerals cannot disappear; they may take other forms and value, but they will always remind humans of how they have (mis-)used them over time.

Linear and Circular Time

Time is a fuzzy concept, almost impossible to define, but always present. To cope with time, humans split time into moments or definite portions. The linear way of representing time, typical of Western culture, is past, present, and future (Janca & Bullen, 2003; Taylor et al., 2016). However, several alternative ways of describing time can be found both in human languages (Pamies-Bertrán & Yuan, 2020; left out for review) and in non-linguistic metaphors and mental models (Hendricks & Boroditsky, 2017). For instance, the perception of time in circles, among Australia's First Nation people

(Janca & Bullen, 2003), can contribute to an additional understanding of how events are placed in time. From a 'time-circle' perspective, an event or thing is related to the center; the closer to the center, the more important the event or thing is (Janca & Bullen, 2003). At the center is the subject-person, with time understood as static. The distance from the center to any 'time-circle' is uniform, signifying that time is both static and omnipresent (see Figure 1).

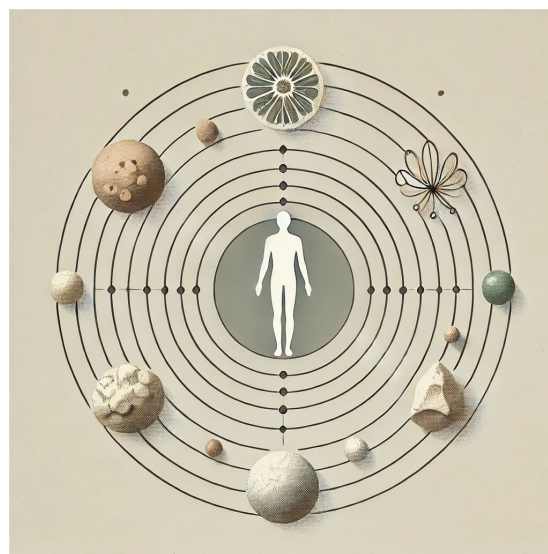


Figure 1. Time-circles and minerals. © DALL-E

Minerals and Time

Linear time can be used to explain the geological time of minerals and their relationship to humans. Minerals are stored in nature for a long time before they become part of technology. The time it takes in which the minerals are mined, sorted, displaced, transported, moved, rinsed, melted, used, repaired, recycled, and disposed of is very short in a geological and linear time perspective.

On the other hand, the conceptualization of time as static, from a 'time-circle' perspective, aligns with the nature of minerals. Minerals are

manipulated for use in the production of our digital technologies, but they will always be present in some form and keep their very long-time perspective, existing long before the Anthropocene and continuing to exist in the geological time that comes after the Anthropocene. They are keepers of time!

'Time-circles' structure the relationship between minerals, as materials of technology, and humans. They change value and meaning for humans as they are more important, closer to the center, or less important to them, distant from the center.

Overconsumption and Time-circles

Overconsumption of natural resources is a complex problem that requires a broad, comprehensive perspective to understand the role of humans in shaping the future of technology. The 'time-circles' perspective gives an additional structure to the relationship between humans and technology, highlighting their dependence on minerals.

Minerals have no value for humans as long they are in nature, however, they are part of a web of structures on Earth. Barad (2003) points out "that the boundaries and properties of the "components" of phenomena become determinate and that particular embodied concepts become meaningful" when they interact. This creates a tension between agencies of minerals and humans. One rhetorical question to explain this could be:

"Is it ok that humans use all the minerals of all the planets in our solar system?"

When humans ideate new technology, does the "concept that becomes meaningful" (Barad, 2003) allow the use of all the mineral resources available to achieve the desired result? The overconsumption of minerals is ethically questionable, especially when digital technologies are relevant and meaningful solely to humankind. Time and 'time-circles' add a new dimension to the short period humans relate to the consumption of minerals, namely when they are mined, are used in digital technologies, and discarded. 'Time-circles' are during this period closer to the center (see Figure 1). Minerals and technology have their own 'time-circles' and they are entangled with humans. This strong connection allows overconsumption by humans, where minerals

are taken for granted as a commodity only humans can access.

Chronopolitics (Wallis, 1970) examines how humans' perceptions of time influence their political behavior. Chronopolitics allows reinterpretations of time, where the "true" meaning of the present is contingent upon which view" (Wallis, 1970, p. 105). The choices made in the present decide which future becomes reality. In the end, humans must reflect on their choices in relation to the creation and use of digital technologies. Chronopolitics and "time-circles" explains why there are difficulties in our society in following the optimal lifecycle of digital technology where repair is preferable over recycling or discarding. When digital technologies are discarded, minerals move to a circle away from the center, and in doing so, humans do not need to relate to them.

"Do humans reflect on the long-term effects of using minerals in technology?"

When recycling minerals or re-entering them into the soil as waste, minerals have changed in composition and have no chance of returning to their original form.

Conclusions

Minerals are keepers of time! They do not disappear; instead, they change forms and roles, reflecting the consequences of humanity's reckless resource consumption. The concept of 'time-circles' provides additional insight into how humans consume resources, often disregarding the natural boundaries set by Earth. Humans frequently distance themselves from technology-related issues, and 'time-circles' offer a possible explanation for this disconnection.

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