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Licking Meteorites and a Pharmacy of un-Earthing

Abstract: In this text, I discuss my recent artistic work with meteorites in relation to possible future schemes to exploit non-terrestrial resources. Meteorites have been entangled with human cultures for thousands of years, from tool-making to religious practices, in scientific research and as commodities in online-markets. Whereas space mining has been a staple of Science Fiction narratives for over a century, national legislations have recently started to allow for actual future extraction and commercial use of resources on other celestial bodies. By employing the conceptual framework of “un-Earthing” as a transdisciplinary approach to explore existing and potential transformations of humans by and in outer space, I approach meteorites and their current commodification as a “pre-enactment” of these possible future scenarios of interplanetary extractivism. In collaboration with the Institute of Pharmaceutical Technologies at the University of Vienna, I produced pharmaceutical products containing meteoritic material and documented the process as well as my performative attempts to approach non-terrestrial material. The resulting short film raises questions about meteorites as a pharmakon of the ambivalent processes of un-Earthing and human-non-earthly relations.

Keywords: space mining; meteorites; pharmakon; speculative pharmaceuticals; un-Earthing.

Meteorites are the oldest material found on Earth, older than anything else on our planet. Most of them are approximately 4.55 billion years old. Meteorites originate from a time when our solar system did not exist as we know it. They come from what is called a protoplanetary disk. When the early sun was surrounded by a disk of dust that had just started to form larger particles, which then formed small chunks of rocks, which were again attracted to each other by gravity, forming larger rocks, which again crashed into each other for millions of years, until, finally, some planets had formed. Which keep attracting meteorites until this day. A planet is a collection of craters.

In 2010 I was working on a series of works I called *How to do Things with Worlds*, in which I transferred J. L. Austin’s notion of performative utterances to performative use of models, miniatures and Science Fiction (SF) scenarios. Through my research into space and SF, I also stumbled across meteorites, which, once in a while, happen to do quite a lot with worlds. Sixty-six million years after the dinosaurs were wiped out by a rock from space, I decided to get some meteorites myself. On eBay. I felt annoyed – if not outraged – by the fact that I could I buy meteorites for two euros.

How could an online market assign such a ridiculously low value to something that is more ancient than the oldest rocks on Earth, more natural than anything we usually have been calling ‘nature’ for far too long? At an art auction, I tried to counter this insolence via artistic valorization: I bought a couple of meteorites, scattered them throughout the auction exhibition space, and gave a short lecture performance about the outrageous handling of meteorites by today’s markets. The piece was called *Den Meteoriten die Würde zurückgeben* – to restitute dignity to the meteorites.

I had done my fair share of research into meteorites, their natural history, and their cultural history. I had looked into the meteorite market and how it had changed over the years, and I tried to sell the meteorites for a much higher price than I had snagged them on eBay. I utterly failed, no one bought a single meteorite from my collection, and no one cared for the accompanying booklet I had published. Of course, my idea was questionable in the first place. There is something cosmically stupid about the idea of returning some dignity to meteorites. Meteorites don’t care about humans. Atoms don’t care about us either, neither do planets, and as we have found out, viruses also couldn’t care less about the state of human affairs.

In 2020, I was beginning to work with a new concept, which I had serendipitously stumbled across while unearthing architectures and space narratives of past futures in Osaka. In common English, to *un-earth* means to dig something up from the ground, to uncover it and bring it to light. Unearthing is to reveal hidden objects from the past and their stories. It is a transitive verb, an action onto an object. Unearthing is an archaeological activity. But I propose another, complimentary interpretation. I propose to “un·Earth” as an intransitive verb. In this use it does not describe an activity towards an object, but rather a process and transformation of a subject. Un·Earthing, in this new meaning, is a perspective towards transformations that happen to humans when they leave Earth. Un·Earthing is the multitude of transformational processes of the human body as well as of human cultures by and in outer space. While unearthing is about objects from the past, directed downwards, un·earthing is aimed towards the future and outwards. As you will hopefully agree, meteorites wonderfully connect these two meanings.

In early January 2020, reports about a new coronavirus from China began to increase in scope and alarm. By March, Covid-19 had arrived in Europe, in my home in Vienna, Austria, and soon everywhere else on the planet. What followed is well known and needs little explanation. In most European countries, the first lockdown was an unprecedented collective experience of social isolation and physical distance. In this strange new situation, which was new to most of us, curator Jacob Lillemose invited me to produce new work for an exhibition at the Medical Museion in Copenhagen. The show, due to open in fall 2021, was part of a larger research project exploring the entanglements of the human body and the world. Aptly named *The World is in You*, the exhibition would also include a section dealing with the human body in outer space.¹ My idea was to follow the notion of un·Earthing as a framework of human transformation in and by outer space.

¹ *The World is in You*, curated by Adam Bencard, Jacob Lillemose, Kristin Hussey, Malthe Kouassi Bjerregaard, Medical Museion Copenhagen, September 30, 2021 – January 16, 2022, <https://www.museion.ku.dk/en/the-world-is-in-you>, acc. on March 5, 2023.

For many years, following and despite my ill-fated meteoritic art auction, I have liked the idea of investing part of my ephemeral production budgets into buying meteorites and using them as components of installations or performances. I have by now acquired a nice collection of small to medium-sized rocks from space.² One of my first ideas for a possible contribution to the Medical Museion's show also involved meteorites – or rather meteorite dust. Concerning processes of un-Earthing that directly affect the human body, what could be the possible scenarios in which humans take in extraterrestrial material? During the Apollo missions, for instance, the astronauts were inadvertently bringing lunar dust into their lander. This dust was showing up as darkish dirt on their underwear, but it would also be a hazard for electronics and possibly their health. As there are no processes of weathering on the Moon, lunar dust consists of microscopic sharp-edged particles whereas dust on Earth is always smoothed by air and water cycles. Dust – and its effects on technology and lifeforms – also poses a problem on Mars, or any of the other rocky celestial bodies.

What if I could anticipate this situation and create products that prepare the human body for later contact with non-terrestrial material? This was my initial starting point, and I soon began to investigate possible delivery systems, i.e. pharmaceutical products that would contain such material, sourced from meteorites. The most obvious choice would have been pills, which I discarded for their utter boringness and ubiquity in art.³ In summer 2020, the race for vaccines against Covid-19 was fully on and I liked the idea of creating an injection of un-Earthing. Needles are a highly ambivalent delivery system, spanning from classic vaccines to socially shunned intravenous drug use. This would be a perfect fit for the likewise vague form of pharmaceutical un-Earthing that I had in mind. On the other end of the spectrum of pharma products, I identified the effervescent tablet as a perfectly innocent delivery of ingredients. The effervescent tablet combines aspects of *en passant* relief of minor symptoms and a low-threshold lifestyle product of self-optimization. This was a perfect match for the neo-colonization of outer space propagated by post-digital entrepreneurs like Elon Musk and Jeff Bezos.

My production research brought me to diverse spaces; multinational drugmakers, local pharmacies, and an Austrian start-up that had just 'reinvented' the effervescent tablet and wrapped it in fancy packaging and marketing language.⁴ Finally, I landed at the most obvious place to produce pharmaceuticals with extraterrestrial material: the Institute of Pharmaceutical Technologies at the University of Vienna.

² According to an article in *The Guardian* from February 2021, meteorites have increased their market prices tenfold over the past decade, mostly due to interest by celebrity collectors: Rupert Neate, "Star Buys: Celebrities Send Meteorite Prices into Orbit," *The Guardian*, February 6, 2021, <https://www.theguardian.com/news/2021/feb/06/star-buys-celebrities-meteorite-prices-elon-musk>, acc. on March 5, 2023.

³ It is also worth noting that I am, *again!*, not the first to have an artsy idea; homeopaths (who else) had already had the profitable fancy to create "medicine" from meteoritic iron long before. Which proves, if nothing else, that truly outrageous creativity had already moved outside of arts and culture long ago. "Meteoreisen Globuli velati," WALA Arzneimittel, <https://www.walaarzneimittel.de/de/arzneimittel/meteoreisen-globuli-velati-wala.html>, acc. on March 5, 2023.

⁴ "Tasty hydration, made simple. waterdrop® helps you drink more water with bursts of delicious flavors made from real fruit and plant extracts. Just drop in water and enjoy from our sustainable drinkware – anytime, anywhere." <https://www.waterdrop.com>.

To my great surprise, Professor Lea-Ann Dailey advised me on actual technical and physiological possibilities and agreed to support a small production run. My idea for injections was quickly discarded as meteoritic material could never be safely injected without potentially catastrophic consequences. Effervescent tablets seemed possible, and after some consideration I started to like the idea of producing suppositories: a delivery system with quick release into the body, mostly known for its use with small children, and certainly a far cry from casually dropping a pill.

Initially I had planned to buy small meteorites and meteorite fragments and then grind them into fine powder. The institute had just acquired a special mill and our test-runs involving a small rock from the asteroid Vesta and a fragment from a lunar meteorite were successful. I did however manage to find much easier access to meteoritic dust. I could get dust directly from online meteorite traders. They sold it as a marketable by-product of their cutting up of rocks from the asteroid belt, the Moon, and Mars in order to create more affordable slices for popular demand on eBay. The dealers, organized in various guild-like associations that also verify the authenticity of their rather expensive rocks, have begun to branch out into various sub-niches of the meteorite market, from esoteric peculiarities to refined offerings of jewelry and novelty products. Over time I had become increasingly fascinated by this market, which had begun drastically changing with the global transformations of the 1990s.⁵

In a slightly ridiculous yet peculiar pre-enactment of possible future economies of interplanetary extraction schemes, meteorite trading is perhaps an early form of *Mining the Sky*.⁶ Narratives of mining have been used as plot elements in science fiction stories from the late 1920s on, echoing an underlying ideology of colonialism and extractivism and the propagation of a new ‘frontier’ in space. Often, mining, prison, and/or outlaw settings are intertwined in these stories,⁷ as if the background of their plots in historical colonialism needed any further validation.

In May 2015, these science fiction scenarios of extracting resources on asteroids or other planets stepped into juridical reality when the United States House of Representatives passed the “Commercial Space Launch Competitiveness Act”.⁸ For the first time, this update to the existing laws for the commercial use of outer space allowed for the commercial extraction of resources on other celestial bodies.⁹ Since then, similar

⁵ The current popular market for meteorites was facilitated by two geopolitical developments: the increased surveying for oil in the Sahara, where meteorites were found and sold by local traders as a by-product of increased neo-colonial activities in the 1980s; and the sudden access to previously closed areas of meteorite falls in the former Soviet Union after 1991. See my earlier work about meteorites: Ralo Mayer, *Den Meteoriten die Würde zurückgeben*, 2009, artist book, 2009.

⁶ John Simpson Lewis, *Mining the Sky: Untold Riches from the Asteroids, Comets, and Planets* (Reading (Ma.): Helix books, 1997).

⁷ Fritz Lang, *Frau Im Mond* (Universum Film AG, 1929); Ridley Scott, *Alien* (20th Century Fox, 1979).
Outlaw territories?

⁸ “U.S. Commercial Space Launch Competitiveness Act” (2015), <https://www.congress.gov/bill/114th-congress/house-bill/2262>, acc. on March 5, 2023.

⁹ For an overview of current developments in space law and artists addressing colonial ideology in spaceflight and space law see: Saskia Vermeylen, “Space Art as a Critique of Space Law,” *Leonardo* 54, 1 (February 2021): 115–24.

laws have been passed in the Russian Federation, China, India, and Luxembourg (the small European Grand Duchy being at the forefront of investor-friendly lawmaking once again). Private investors had begun to support companies in designing and planning technology to extract and refine material from asteroids and potentially bring them back to Earth – like an economically induced and controlled meteorite fall, this would be the beginning of an interplanetary supply chain.

Any potential future use of material from beyond Earth would certainly not be a historic first. Almost 3,000 years before the Iron Age, meteoritic material was used in ancient Egypt to produce jewelry and daggers.¹⁰ Most meteorites are older than our solar system, with the notable exemption of the small percentage ejected into space from Mars or the Moon when other meteorites hit their home body. If we follow the outdated logic of the “Modern Constitution” of separating all things in the world into the spheres of nature or society,¹¹ meteorites are indisputably natural. There’s nothing we can find on Earth that would be more nature. And yet, and to perfectly support Bruno Latour’s point of critique on the nature-culture divide, these rocks from the sky have been entangled in human culture for thousands of years, if not since its beginnings.

Meteorites are the primordial harbingers of un-Earthing, transgressing the borders between Earth and outer space, spawning stories and swaying cosmographies, creating long-lasting craters in the fabrics of fiction and reality. It was mandatory to include them in a preliminary *Index of Unearthing*, a presentation I prepared for the 12th SAR Conference on Artistic Research in 2015.¹² My contribution was in the form of a pre-recorded video lecture that played with conventions of transmissions and log entries in science fiction films vis-à-vis real-time online formats in pandemic times. The format of the pre-recorded video lecture, at least for me, turned out to be a labor-intensive exercise that resembled making a film, but without the budget or the time. Throughout the recording of the lecture, I struggled to find images and performative moments in front of the camera. When my presentation came to the point of mining, I grabbed a rather chunky and weathered iron meteorite that’s been sitting on my desk for ages and presented it as a reference to future space mining. I was trying to find the right angle at which to display it when I suddenly felt a peculiar curiosity about its taste. A strong urge to lick it overcame me – and I gave in.

I had discussed my idea – pharmacological products containing extraterrestrial matter – with curator Jacob Lillemose for quite some time and we both shared a wariness about ending up with an all-too-obvious, in-your-face artwork comprised of pills. My suggestion was to present the process as a highly stylized video of pharmaceutical manufacturing, employing a unique and expensive macro-lens that I had

¹⁰ Maria Golia, *Meteorite*, Earth Series (London: Reaktion Books, 2015); Mayer, *Den Meteoriten die Würde zurückgeben*.

¹¹ Bruno Latour and Catherine Porter, *We Have Never Been Modern*, trans. by C. Porter (Cambridge, MA: Harvard University, 1993).

¹² Ralo Mayer, “An Index of Un-Earthing: Log Entries towards the Decolonization of Outer Space,” 2021, <https://www.researchcatalogue.net/view/1564288/1564271>, acc. on March 5, 2023.

immediately fallen in love with. I also wanted to use some of my pandemic modular synthesizer exercises for a soundtrack. Jacob was not entirely convinced and feared the worst. Half-jokingly I told him about my new meteorite-licking shtick and sent him stills from the conference presentation. And suddenly it became obvious that this was the simple, stupefying, and ambivalent performative element that had been missing. Licking meteorites was the straightforward, yet flamboyant paraphrase of elaborate pharmaceutical processes and products. Both approaches were not exactly telling the same story, but together they might create a vague imaginary of the processes of un-Earthing I wanted to explore in the context of the exhibition.

In the following weeks I was looking for good-sized meteorites and meteoritic dust. I got in touch with a seller on eBay who offered both, and explained my budget and what I was looking for. The next day he sent me a video file. It was a tour of his stock and workshop in Spain, recorded on his mobile phone, with his live comments as instant voice-over track. In 10 minutes and 43 seconds, Sean, the meteorite hunter-trader, created the most perfect vernacular filmic representation of many of the aspects I had always found intriguing about meteorites and especially the strange economy of its online trading. The video made me seriously doubt if I could ever surpass its casual perfection in telling my story. I got a good package price on several vials of dust from Mars, the Moon and the asteroid belt, and a couple of meteorites ranging from tiny fragments to hand-sized pieces that still carried the smell of their fiery re-entry into Earth's atmosphere.

In the further process I learned some basics of pharmaceutical production from the staff at the Institute of Pharmaceutical Technologies. We filmed the manufacturing process, took some intriguingly majestic close-up shots of rocks from space, and then I licked some meteorites. More than a year has passed since, yet I am not capable of properly reflecting on the film that resulted from this footage and the aforementioned ideas, research and considerations.¹³ The closest I have come to understanding it is that there are two dream-like layers interlocking with one another.¹⁴ It is as if one dreams the other, and the other way around. While trying to establish a performative

¹³ Ferdinand Schmatz frequently pointed me to Roman Jakobson's discussion of "the Metaphoric and Metonymic Poles". Concerning my ineptitude to grasp with words the film *Un-Earthing* (*pharmakon*), I would like to refer to a related quote of his own writing here: "Vielleicht klingt es im ersten Moment mythisch, doch wir brauchen nicht alles rational verstehen. Es gibt eine wortlose Erkenntnis, die nicht zuletzt der bildenden Kunst nahe steht, wo es Arbeiten gibt, die aufgrund einer Übersetzung in Worte banal werden oder ihren Sinn verlieren. Entscheidend ist, dass das Verhältnis der auftauchenden Objekte in Bezug auf ihre Funktion im Kontext des Erwartungshorizonts gestört wird. Damit meine ich nicht nur eine Verschiebung von Objekten ins Museum wie bei Duchamp, sondern literarisch gesprochen Vermischungen von Metapher und Metonymie, die zu einer Störung konventioneller Handlungen führen und neue Handlungskontexte erschließen. Während die Metapher ein vergleichendes Sinnbild ist, zielt das Metonymische auf den Satzbau, das heißt, die Metapher tauscht aus und die Metonymie kombiniert. Jakobson sagte, die entscheidende Literatur ist die der Projektion der Metapher auf die Metonymie." Ferdinand Schmatz, *Auf Sätze! Essays Zur Poetik, Literatur Und Kunst*, Edition Angewandte: Buchreihe Der Universität Für Angewandte Kunst Wien (Berlin, Boston: De Gruyter, 2016), 412; Roman Jakobson and Morris Halle, "The Metaphoric and Metonymic Poles," in *Fundamentals of Language*, Reprint of the 2., rev. ed. 1971 (Berlin, New York: Mouton de Gruyter, 2002), 90–96.

¹⁴ Space archaeologist Alice Gorman has likened the film's atmosphere to Maya Deren's work, a comparison I find extremely flattering.

relation with the meteorites my approaches oscillated between my experiences as a parent of a baby and an entire spectrum of sensual and physical encounters. My meteorite-licking started sometime during the third lockdown in Austria. The pandemic's effect on social and physical relations and the resulting experiences of isolation and distance played an obvious role throughout the entire project. And so did the quest for pharmaceutical and medical answers to the pandemic.

The Greek word *pharmakon* presents an interesting spectrum of meanings: remedy, poison, but also scapegoat¹⁵ Jacques Derrida's influential text, *Plato's Pharmacy*, focused on writing as *pharmakon*,¹⁶ but Isabelle Stengers applies its inherent instability and refusal of dichotomies to questions of ecology: "The lack of a stable and well determined attribute is the problem posed by any *pharmakon*, by any drug whose effect can mutate into its opposite, depending on the dose, the circumstances, or the context, any drug whose action provides no guarantee, defines no fixed point of reference that would allow us to recognize and understand its effects with some assurance."¹⁷

The *pharmakon* undercuts binary logic, it is an agent of transformation, blurring, and changes of perspective. In his "body-essay", *Testo Junkie*, Paul B. Preciado writes about his off-label use of pharmaceutical testosterone to challenge gender roles and sexual identities, intertwining his performative investigation with an analysis of the history of the industrial synthesis of hormones.¹⁸ In a non-verbal way, my film *Un-Earthing (pharmakon)* explores potentialities of human-non-earthly relations in what could be interpreted as a parallel approach. These relations of un-Earthing can be seen through our specific moment in time, when the first laws for space mining and the commercial exploitation of extraterrestrial resources are being passed. At the same time, this exchange is not new or of the future. Our bodies, our biosphere, and our planet have always been entangled with what we regardlessly still call *outer space*.

¹⁵ I'm extremely thankful to Jon McKenzie for bringing the term (albeit in another context, and with much more theoretical foundation) to my attention during a Zoom-meeting in late 2020. I take some liberty in my own eclectic interpretation and use of it.

¹⁶ Jacques Derrida and Barbara Johnson, "Plato's Pharmacy," in *Dissemination* (Chicago: The University of Chicago Press, 2016), 67–186.

¹⁷ Isabelle Stengers, *Cosmopolitics*, *Posthumanities* 9–10 (Minneapolis: University of Minnesota Press, 2010), 29.

¹⁸ Paul B. Preciado, *Testo Junkie: Sex, Drugs, and Biopolitics in the Pharmacopornographic Era* (New York, NY: The Feminist Press at the City University of New York, 2013).



Still from *Un-Earthing (pharmakon)*, Ralo Mayer / Bildrecht, 2023



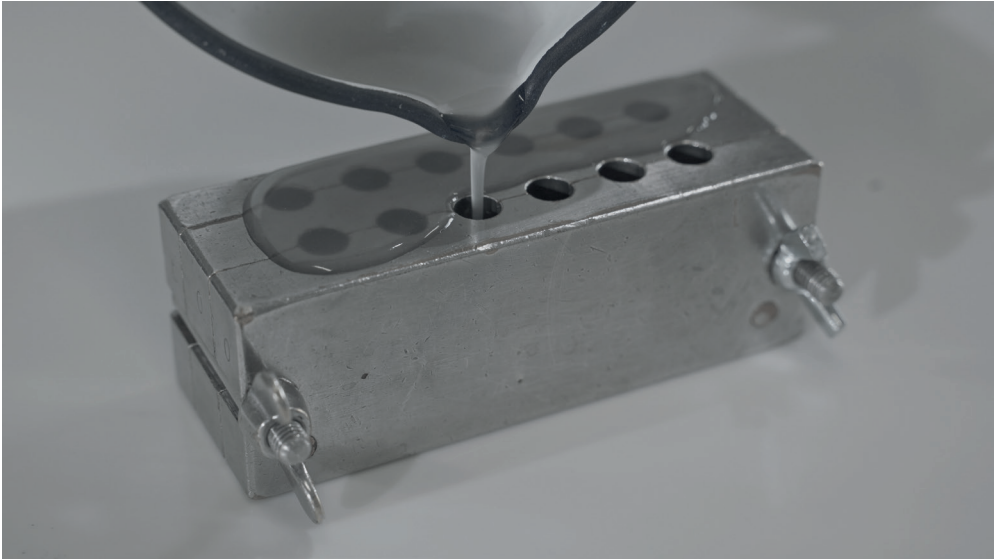
Still from *Un-Earthing (pharmakon)*, Ralo Mayer / Bildrecht, 2023



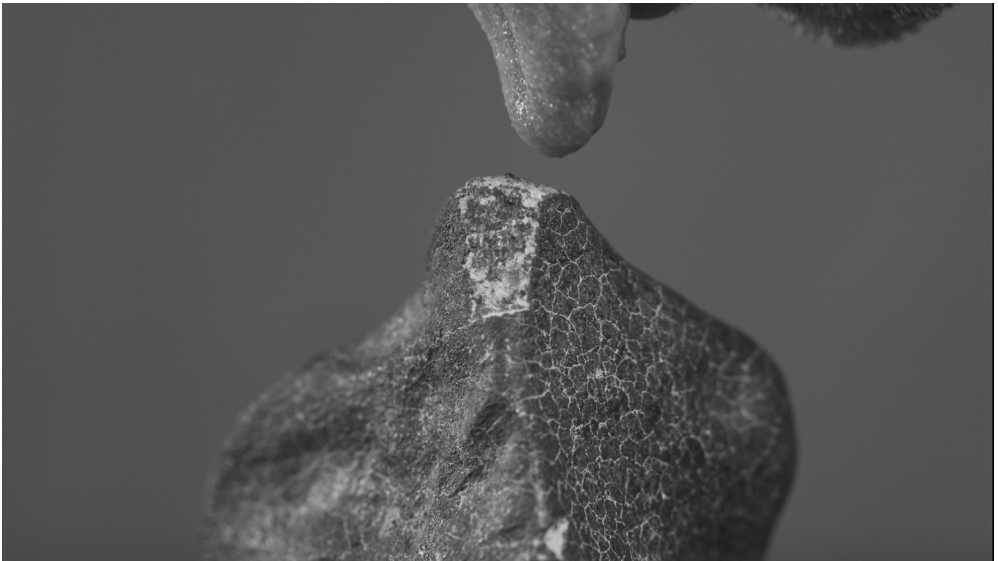
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Article received: December 23, 2022

Article accepted: February 1, 2023

Original scholarly article