

Texts to read together (Peera and Laassaniemi mires)

1. “Permafrost is defined quite literally as ‘permanent frost’, or “ground that remains frozen for two or more consecutive years”. Due to its location between roughly 2 and 300 meters beneath the earth’s surface, it is, by definition, held at a distance from our human bodies. Yet, as it thaws it comes closer, collapsing the solid ground beneath our feet. As permafrost transforms from solid to liquid to gas, its thaw releases not only methane, CO₂, mammoth carcasses and ‘zombie viruses’, but also man-made chemicals, forgotten technological objects and the human memories and emotions that accompany them.”¹
2. “Despite its name, permafrost is neither permanent nor strictly frozen. Mistranslation explains part of the confusion. The Soviet scientists who helped the Bolsheviks colonize northern Siberia in the early 20th century named the squishy, semicrystalline earth *vechnaya merzlota*, a phrase that is almost untranslatable into English but might be better rendered as ‘perpetually refreezing.’ (Indigenous Siberians such as the Evenki, Sakhans, and Yakuts have no single word for the kind of earth their territory covers.)”²
3. Many attempts to measure and calculate the age of permafrost have been made by scientists. It is estimated to be between 2 and 700,000 years old. It is also estimated to store nearly half the world’s soil carbon...³
4. “With today’s climate policies, the world is on the course to 2.8 C swarming, and about half of the permafrost could disappear. If the world warms even more, only small permafrost areas will remain.”⁴
5. “The analysis of the aerial photography time series indicates a rapid degradation of the permafrost in north-west Finland over the past 60 years. At the Peera and Laassaniemi palsa mires, the extent of palsa area degraded over 75% between 1959 and 2021... Winter air temperatures and precipitation have increased significantly here. The climatologically most optimal conditions for palsa existence -3 to -5 degrees Celsius.”⁵

¹ Taylor’s quote, *A feeling of longing that freezes and thaws*, 2025.

² Lynne Peskoe-Yang, “An Ode to Arctic permafrost,” *Science*, Vol. 379, Issue 6639 (31/05/2023), <10.1126/science.adf6999>.

³ Singleton, Caitlin, et. Al, “Methanotrophy across a natural permafrost thaw environment”, *The ISME Journal* 12, 2544-2558.

⁴ Center for Biogeochemistry in the Anthropocene Annual Report, University of Oslo, 2022

⁵ Verdonen, Mariana et. Al, “Permafrost degradation at two monitored palsa mires in north-west Finland”, *The Cryosphere*, 17, 1803-1819.

6. “A 1 meter long steel rod was used to measure the depth of the active layer. In total, 515 points were measured at Peera.⁶ (*In other words, Peera’s skin was probed and punctured 515 times.*)
7. “When we’re coring, that’s kind of our stratigraphy. We have the unfrozen active layer part where we dug the hole. Then we start hitting the ice, the permafrost... Then afterwards we want to core down to the mineral. And what we were interested in yesterday is the part right above the mineral, because that’s the onset, that’s the oldest peat— the oldest organics... in the permafrost. So above the mineral, in the permafrost. And that will give us the basal age, or the base age of this whole complex in a way. The last time we didn’t core until here, just until there. So we missed a few centimeters, and that’s why we changed location and now we found it. And what’s interesting is it hasn’t been published, or it’s not known yet, what the age is. And now we have that sample. Twice. So... that’s pretty nice.”⁷
8. “Large areas of Arctic permafrost are covered by peatlands: wetland ecosystems that have a layer of partially decomposed organic matter (peat) at the surface. Of the estimated 5 million km² of peatlands globally, most are in the subarctic and boreal zones. Northern peatlands cover close to 4 million km², almost half of which— about 1.7 million km² – are underlain by permafrost. Peatlands are significant carbon storehouses, containing almost one-third of the world’s soil carbon, an estimated 450 to 650 billion tons.”⁸
9. “Thermokarst is an erosional process whereby the thawing of permafrost leads to the settling, collapsing, or slumping of the ground when excess ground ice, such as ice wedges, melts. Approximately 3.6 million square kilometres, or 20 percent, of the northern permafrost region is covered by thermokarst landscapes. Numerous landforms are associated with thermokarst regions. Thermokarst lakes and ponds are found over much of the Arctic landscape, formed in depressions created by the thawing of ice-rich permafrost.”⁹
10. “And see this, really peaty stuff. You can see this layer of organics. It’s super light, basically just carbon, just organic matter...this should still be active layer, so surface stuff. And this is the intersect... the interface between the active layer and the permafrost. So it gets darker the more you go down... And here it gets sandier, or more mineral-ish, less organic...And then [this whole sequence] topples over into

⁶ Ibid.

⁷ Quote: Mats Ippach, PhD, Department of Geosciences, University of Oslo, Sept. 2024, at permafrost palsa mire, field site in Aidejavri/ Idjajávri, Norway/ Sápmi

⁸ *Arctic Permafrost Atlas* (GRID Arendal, 2023), p. 63.

⁹ Ibid, p. 14

that, and it thaws. See, you're standing now on one of these 'fallen-over things'. So the stratigraphy is messed up."¹⁰

11. "Our findings imply that the active layer thickness in the inner parts of palsas do not necessarily reflect the overall permafrost conditions and underline the importance of surface position monitoring alongside the active layer measurements. The results also showed a negative relationship between the active layer thickness and snow cover onset, indicating the complexity of climate–permafrost feedbacks in palsa mires."¹¹
12. "In Sakhyan mythology, the world is split into three realms: the underworld, the surface and the heavens. These realms must be finely balanced in order for Sakhans to live harmoniously with their environment. Permafrost acts as a barrier between the underworld and the surface (where humans live), the integrity of which must be treated with respect, otherwise evil spirits can escape."³² "The location of the underworld is often anchored to the landscape itself, with Finnish Sámi understanding access to the lower realms to be found through Saivu lakes, with sacrificial sieidi stones acting as portals".¹²
13. "Understanding 'abyss' as a bottomless or groundless space, 'abyssal intimacy' with species or entities that seem distant from us becomes possible when our perceptual ground recedes, opening towards an alternative perception of a kind of "time-out-of-joint".¹³
14. "Permafrost soils have been shown to be microbially diverse terrestrial ecosystems... These psychotolerant microorganisms also have to endure other stressful conditions, including high salinity, low water and nutrient availability, as well as anoxia and low pH in frozen bogs and fens. Permafrost "microbes" include bacteria, archaea, fungi, algae, protists, and viruses. Protozoa have also been isolated from permafrost. The types of microbes and their ability to survive depend on a variety of factors, including the permafrost age and chemical composition. Whether any of these microbes are potentially pathogenic to humans, other animals, or plants is a current concern and the topic of considerable debate."¹⁴

¹⁰ Quote: Mats Ippach, PhD, Department of Geosciences, University of Oslo, Sept. 2024, at permafrost palsa mire, field site in Aidejavri/ Idjajávri, Norway/ Sápmi

¹¹ Verdonen, Mariana et. Al, "Permafrost degradation at two monitored palsa mires in north-west Finland", *The Cryosphere*, 17, p. 1803.

¹² (Aikas and Spangen, 2015) quoted in Charlotte Wrigley, "Going deep: Excavation, collaboration and imagination at the Kola Superdeep Borehole", *EPD: Society and Space* (2023), Vol. 41(3), p. 550.

¹³ Nigel Clark, cited in Nina Lykke's text, "Co-Becoming with Diatoms: Between Posthuman Mourning and Wonder in Algae Research", *Catalyst* (2019), p. 6.

¹⁴ Ruonan Wu, Gareth Trubl, Neslihan Taş, Janet K. Jansson, "Permafrost as a potential pathogen reservoir, *One Earth*, Volume 5, Issue 4, 2022, p. 351-360, <<https://doi.org/10.1016/j.oneear.2022.03.010>>.

15. “We argue that in the absence of a global tipping point there is no safety margin within which permafrost loss would be acceptable. Instead, each increment of global warming subjects more land areas underlain by permafrost to thaw, causing detrimental local impacts and global feedbacks.” [...] “Therefore, the projected permafrost areas should be considered reflective of near-surface conditions under rapid climatic changes.”¹⁵
16. “The earth in its depths must remain dead and cold, incapable except of slow crystalline change; but at its surface, which human beings look upon and deal with, it ministers to them through a veil of strange intermediate being”.¹⁶
17. “Permafrost is an abstract, distant, thermodynamic entity, that we once perceived to be eternal.”¹⁷
18. “Can permafrost go extinct?”¹⁸
19. “You can here it in this room. Murmuring, heaving, cracking, breathing.”¹⁹

¹⁵ Nitzbon, J., Schneider von Deimling, T., Aliyeva, M. et al. “No respite from permafrost-thaw impacts in the absence of a global tipping point.” *Nat. Clim. Chang.* 14, 573–585 (2024). <<https://doi.org/10.1038/s41558-024-02011-4>>.

¹⁶ John Ruskin, *Modern Painters*, Vol. 1, 1843 cited in : Stephen Kite, “From Earth Veil to Wall Veil: Ruskin, Morris, Webb, and the Arts and Crafts Surface”, in *Ruskin’s Ecologies: Figures of Relation from Modern Painters to The Storm-Cloud*, Ed. Kelly Freeman and Thomas Hughes (Courtauld Books Online). DOI: 10.33999/2021.61).

¹⁷ Taylor’s quote, *A feeling of longing that freezes and thaws*, 2025.

¹⁸ Ibid

¹⁹ Ibid