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Infrastructuralizing outer space, un-earthing anthropology

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On October 14, 2020, the Swedish government announced its decision to grant 90 million SEK to support the expansion of Sweden’s space center and rocket-launching site Esränge, located some 40 kilometers east of Kiruna in the very north of the country. The contribution is part of a larger investment in the modernization of the space center, which began in 2015 and now adds up to a total of around 300 million SEK. As stated in an article published on the Swedish Space Corporation’s (SSC) website, the decision “allows SSC to proceed with its goal to be able to send small satellites into orbit by 2022”. Echoing Sweden’s space strategy from 2018, the article further explains that the expansion will help position Sweden “as a prominent space nation within the European and global sector”. A quick Google search reveals that similar developments are currently unfolding at Andøya Space Center, Norway’s rocket-launching site, situated only about 300 kilometers northeast of its Swedish equivalent. Although usually described in friendly terms, some have framed this as a small space race, playfully likening it to that which took place between the two Cold War rivals, the Soviet Union and the United States. But Sweden and Norway are not alone in their space endeavors. A similar program was recently announced in Scotland, and activities such as these have long been undertaken in several other places around the world. In other words, if plans successfully materialize, by 2022 Sweden will be but one among over a dozen nations already capable of launching satellites into space.



Screenshot from SSC's twitter account, October 14, 2020. Watch the embedded video [here](#).

Seeking to extend Sweden's self-declared role as a moral superpower beyond the planetary, the Swedish space strategy promotes peace (*fred*), sustainability (*hållbarhet*), and transparency (*transparens*) in a realm that has recently been widely framed as a problem to be addressed infrastructurally to ensure the continuation of digitally mediated forms of human organization on the planet. With an increasing reliance on post-terrestrial infrastructure, space weather, space debris, and potential outer space military expansion present new risks to critical, ground-based infrastructure (Taylor 2020). In tandem with this, a rapidly growing New Space industry has begun to commercialize outer space, pushing former government-centered paradigms toward opening up “a free-market space frontier” (Valentine 2012: 1047). It is in response to these developments and perceived threats that Scandinavian countries, in collaboration with the European Space Agency, now aim to strengthen independent European access to outer space by offering infrastructural services to various state and non-state actors. As the Swedish strategy contends, “An investment in space is ultimately an investment in Earth” (Regeringen 2018: 4).

My concern in the present text is this renewed, global interest in outer space as an arena for projection, experimentation, and infrastructural possibility, able to support and/or limit human existence on the planet. In what follows I provide a brief background to the topic and outline an approach that takes cue from the anthropology of infrastructure. I then account for some of the anxieties provoked by these initiatives among Sami reindeer herders, whose lands are being considered for the expansion of the Swedish space center. Against this backdrop, I finally suggest that emergent, infrastructurally mediated engagements with the extraterrestrial—or, if you will, the “environment of ‘the environment’” (Olson 2018: 21)—present a promising site for the “un-earthing” (Olson and Messeri 2015) of anthropology’s terrestrially grounded terms of engagement.

Infrastructuralizing outer space

We’re slowly coming to suspect that the space
we’re traveling through is of a different kind
from what we thought whenever the word “space”
was decked out by our fantasies on Earth.

- Harry Martinson, *Aniara*

The recent turn to infrastructure has proven extraordinarily productive for the anthropological study of social, cultural, and political relations (see Harvey et al. 2017). As Penny Harvey (Venkatesan et al. 2018: 6) notes, “infrastructures emerge as classic anthropological entities, relational distributed things that are also and simultaneously relations between things”. In addition to an arena for symbolic projection and representation (Larkin 2013), infrastructures

are capable of instigating a wide array of unanticipated effects (Jensen and Morita 2015). Infrastructures do so not least by reconfiguring relations between entities otherwise imagined to belong to altogether separate spheres. For instance, Atsuro Morita (2017) offers a thought-provoking account of how concerns about the risk of flooding in Bangkok have led to a growing appreciation for floating rice fields. Similarly, Ashley Carse (2012) elucidates the process whereby forests become assigned with infrastructural functions for the management of the Panama Canal. And turning to the context of Chinese environmental politics, Jerry Zee (2020) attends to efforts set out to enroll the atmosphere in extensive infrastructural assemblages purposed to manipulate the conditions that propel dust-storm formation.

In the introduction to a recent Roadsides issue, Christine Bichsel (2020) observes how human engagement with the extraterrestrial is often a “highly material and technology-intensive activity” (ibid.: 3). Inquiry into infrastructure may therefore serve as “a key entry point for unravelling the relationalities of Earth and outer space” (ibid.: 2). This aligns well with the burgeoning interest in “environmental infrastructures” (Jensen 2015) as exemplified by Morita, Carse, and Zee mentioned above. These works hint at the way post-terrestrial infrastructures might now even be modifying that which humans encounter as the environment (Hetherington 2019), and the very boundaries “where environmental relations begin and end” (Olson 2018: 224). Importantly, these deliberations beg the question of how outer space comes to be postulated in an infrastructural register in the first place.



D-SEND drop test at Esrange Space Center in August 2013. Photo: Hans-Olov Utsi. Copyright SSC.



Launch of a stratospheric balloon at Esrange Space Center. Copyright SSC.

While early ethnographic inquiry into infrastructures set out to trace invisible flows and (dis)connections (Bowker 1994; Star 1999), recent attention has been oriented to moments whereby infrastructural relations become foregrounded *emically* to interlocutors themselves (Morita 2017). In the context of my present discussion, reconsiderations of what the infrastructural consists of can be discerned in ongoing efforts to brand the city of Kiruna as an outer space metropolis (*rymdmetropol*). In these conceptions, the city promises to bring outer space closer to Earth by virtue of its arctic position, relatively unoccupied airspace, vast and supposedly empty surroundings, and historical prominence as a site for aurora research. Similar ideas surfaced in a recent panel discussion in Kiruna between representatives from SSC Esrange, the Swedish Institute of Space Physics, EISCAT Scientific Association, Luleå University of Technology, and a local High School. The panelists not only agreed that the expansion of Esrange will truck in new economic opportunities to the region but posited the latter's geography as especially convenient for such developments. Portrayals of outer space as an infrastructural phenomenon invoke landscape as integral to a more extensive "on/off Earth" (Bichsel 2020) infrastructural figure.

Enactments of “landscape as [outer space] infrastructure” (Bélanger 2009) are happening in tandem with how the extraterrestrial is increasingly being framed as a problem to be addressed infrastructurally to guarantee the continuation of digitally mediated modes of human relationality on the planet. “Space is an extremely important infrastructure-environment [*infrastruktur miljö*]”, one panelist pointed out, “because much of our societies depend on satellite communication”. Aside from the need to come up with ways to more effectively attract private capital to the Swedish space industry, the above-mentioned space strategy outlines some of the elements—potential military expansion (*utplacering av vapen*), space junk (*rymdskrot*), and space weather (*rymdväder*)—that together imperil various forms of ground-based infrastructure. Such perceived threats contribute to conjuring outer space as a matter worthy of stronger governmental attention. The document states:

Society has become all the more dependent on services and functions provided by satellites. It has therefore become increasingly important that we protect the outer space-environment [*rymdmiljön*] and that it is kept free from conflicts, and to ensure access to space and to those infrastructures in space that society depends on (Regeringen 2018: 3).

As outer space turns into an infrastructural problem, it is also given leeway to begin folding landscapes and ground-based infrastructural systems into itself, thereby pulling terrestrial attention skyward to an increasingly obtrusive object of human concern. I raise a number of questions here: How does Sweden mobilize itself as a brand within wider initiatives to increase European presence in outer space? What forms do concepts such as “peace” and “sustainability” assume when projected onto a domain that has long been framed in militaristic terms and only recently become re-apprehended as subject to pollution? And what

are the implications of “transparency” in a realm that lies well beyond the threshold of direct human perception? As one of the panelists humorously responded when asked why their activities are always situated in remote and obscure settings: “Isn’t that what space is? Far away, where you can’t see anything, and where it’s dark?” Accordingly, how do actors work to bring the extraterrestrial down to Earth as an object of public and governmental concern? How do these actors deal with the limits of such translations?

Un-earthing anthropology

We came from Earth, from Dorisland,
the jewel in our solar system,
the only orb where Life obtained
a land of milk and honey.

- Harry Martinson, *Aniara*

Now, these initiatives stir concern among Sami reindeer herders whose lands are being considered for the expansion of Sweden’s rocket-launching site and related activities. Disagreements cropped up during a discussion aired in April 2020 on SVT, the Swedish national public television broadcaster, between Anders Kråik, Sami politician and entrepreneur, and Gunnar Selberg, entrepreneur and municipal council Center Party politician. Whereas Selberg underscores the importance of local development projects to make sure that the region keeps growing, Kråik recounts how the Sami have been historically marginalized by the Swedish state precisely by way of such initiatives. He understands these ongoing expansions to be part of more long-running attempts to assimilate the Sami. However, Selberg does not accept this history as a legitimate reason to prevent development.

To him, everything comes down to the question of who has the right to the land and what it should be used for:

We can't survive on the reindeer herding industry [*rennäringen*] alone, and allowing for reindeer herders [*renskötare*] and Sami villages [*samebyar*, economic and administrative reindeer husbandry unions] to prevent development is practically a catastrophe—not only for us but for the reindeer herders themselves. Because if we cannot develop this issue with outer space, the rocket-launching site at Esrange, the EISCAT antenna park in Kaisaniemi, and other things, if we don't allow for these to grow and turn Kiruna into an attractive and strong labor market and healthy society, then we will all suffer.

Kråik reminds Selberg that Sami villages are legal stakeholders. Each village has the right to either decline or grant permission for whatever is being proposed. Selberg maintains that, according to his experience, the Sami systematically say no to everything, “I can give you hundreds of examples when you say no!” He says that he would even like to make the economic compensation for encroachment so high “that the Sami village actually *wants* to have this antenna park in their territory”. Kråik objects, explaining,

compensation can be an important aspect, but it is also important to preserve sustainable pasture, because the nature of reindeer herding depends on the availability of large areas to be able to survive seasonal changes. The mountain-world [*fjällvärlden*] in this arctic environment doesn't offer particularly good conditions for pasture during winter.

It all works through a process of consultation, he continues, but “oftentimes the Sami villages are superseded and there’s exploitation anyway”, ultimately eradicating extensive grazing fields. “How do you compensate pasture?” Selberg is nevertheless firm in his opinion. In order to prevent depopulation, they need to prioritize development. And this is so regardless if you are a reindeer herder or not.

As evinced by these tensions, emergent outer space imaginaries are currently being interrogated by collectives that experience such concerns as threatening to their own forms of livelihood on Earth. The repurposing of outer space is evidently grounded in ways that are at odds with other territorial claims and understandings of what is valuable for terrestrial life (Redfield 2002). As endeavors that are promoted against the background of an explicit concern with human life on the planet, contemporary efforts to repurpose the extraterrestrial raise important questions as to what exactly is at stake for the anthropological.



Aurora borealis (norrsken) in northern Sweden. Source: pikist.

By extending the realm of politics and the social beyond Earth (Battaglia et al. 2015; Olson 2018), the “infrastructuralization” (Ballesterio 2019: 22; see also Blok et al. 2016) of outer space also constitutes a site for un-earthing an array of anthropological categories (Buchli 2020). Valerie Olson and Lisa Messeri (2015), arguing along similar lines with regard to the “Anthropocene”, suggest that we keep this notion “connected to its spatial absences and physical others, including those that are non-*anthropos* in the extreme” (ibid.: 28, emphasis in the original). Restricting themselves to the atmospheric, others advocate the deterritorialization of anthropology by attending to the aerial as something that might help reconsider terrestrially grounded concepts and descriptions (Howe 2019). Interestingly, in the case under consideration in the present text, deterritorialization seems to be happening emically, as planetary life is increasingly seen as mediated and compromised by domains that lie well beyond the earthbound. Besides, while anthropologists of atmospheres observe how grounds sometimes are lifted to be held in atmospheric suspension (Choy and Zee 2015), here I am equally interested in the way the extraterrestrial becomes infrastructurally folded into ground; “how space things become Earth things and vice versa” (Olson 2018: 2015; see also Buchli 2020: 22).

What happens to social, cultural, and political relations when confronted by outer space as an infrastructural phenomenon, and how may the implications of such encounters be made to bear upon these fundamentally “anthropolitical” (Boyer 2019) categories? How might ongoing efforts to infrastructuralize outer space help “redescribe” (Strathern 2020) anthropological reflexivity’s terrestrially grounded terms of engagement?

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