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**ENCOUNTERS AT THE EDGE OF SPACE INFRASTRUCTURE:
SPACE DEBRIS AND NORTHERN RUSSIAN HUNTERS AFTER THE END OF
THE SOVIET UNION**

Master's Thesis

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Introduction

Seven years ago, due to my interest in the temple architecture of the Russian North, I traveled around the Arkhangelsk Region. It was while visiting the villages along the Onega River that I first heard about the Spaceport Plesetsk — my interlocutors complained about the space launches, linking them with the deterioration of the health of local communities. However, I was told that people living closer to the Spaceport faced greater space-related concerns. Since 1963 the Spaceport started operating as one of the country's main facilities to launch satellites into space. After each launch several stages were falling back to the fallout zones allocated approximately a thousand kilometres away in sparsely inhabited areas along the Mezen River Basin in the regions' Northeast. These zones have become vast, national inlands, effectively turned into scrap yards, littered with space debris from the 1960s onwards.

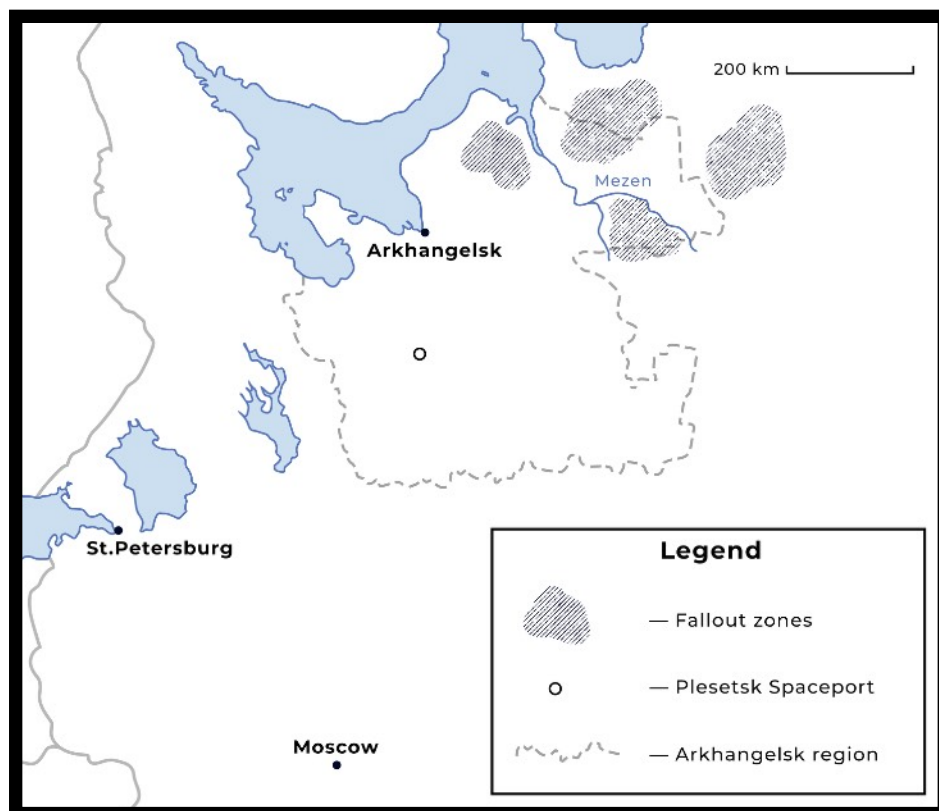


FIGURE 1. Map of the research area. Map by Makar Tereshin.

This is how I first heard about my future field site — the Mezensky District — where the material afterlives of discarded rocket boosters were not solely limited to abandonment: the debris was salvaged by scavenger brigades of nearby villagers who were well familiar with the surrounding landscapes and sought to sustain their households under conditions of post-soviet crisis and uncertainty. Located by the coast of the White Sea, the Mezensky District lies in the far Northwest of the Arkhangelsk region and is named after the Mezen River that flows through the entire district and into the White Sea. The district's territory covers 34,400 square kilometres and its population in 2020 was 8,294 people (Mezenskiy munitsipal'nyy rayon, 2021). Nearly half of the population lives in the city of Mezen and the neighbouring urban-type settlement Kamenka, while others are living in the numerous villages along the White Sea shore, Kuloi and Mezen Rivers and its tributaries Pyoza and Kimzha.

Historically, the Lower Mezen was populated by Russian fishers and hunters who were moving to the West from the city of Arkhangelsk starting from the XVI century — when the first Russian settlements along the coastal areas of the White Sea and Mezen' were established (Drannikov, 2020; Bernshtam, 1978). Russian presence in the area, that was previously predominantly populated by the Nenets and the Komi, along with the establishment of the city Mezen, provided a vantage point to reach the Pechora river — one of the main water passageways to the Ural and beyond. However, despite being a critical node in Russian colonisation of the North, the eastern part of the district along the Pyoza river remained essentially unpopulated with just a few inhabitants in each village. Among them were the Old Believers who settled there in order to evade state control and persecution in the late XVII-XVIII centuries, as well as some hunters and their families who were moving upstream in the XIX century.

Krecheulovo, a village stretched along the middle course of the Pyoza, became the main location for my fieldwork. Founded in the mid-XIX century, today it is a small, half-empty settlement with ten single-family homesteads — a northern type of dwelling that brings the main house, barn(s), and livestock stall(s) under one roof. To the north, the village borders an open tundra while to the south, it overlooks a mixed forest tundra that is dotted with villagers' hunting bases. There are only very limited means of

transportation in the area. Planes or helicopters are cost-prohibitive for regular usage and primarily reserved for important visits to the regional capital, Arkhangelsk. The district itself did not have an established road to Arkhangelsk until 2008. Till today, the villagers are heavily dependent on the waterways for yearly delivery of essential goods and fuel. The road is paved only to the nearest village of Komarovo, the administrative centre of the Pyoza River in charge of upstream villages that stretch along the river for 200 kilometres. There are no roads further up the river and during the summer, one must travel by boat along the shallow and winding river. In winter, a winter road (*zimnik*) for snowmobiles is the main link between settlements and the outside world. Despite the physical proximity (nearly 100 km from the city of Mezen), it is extremely time consuming to get to the district centre from Krecheulovo — travelling the river or winter road depends very much on the mercy of the weather that sometimes brings all movement to a halt for several weeks.

Logging, cattle breeding, farming, fishing, and hunting were at the heart of the district's economy. Before the dissolution of the Soviet Union, Krecheulovo operated as the centre of the local state farm (*sovkhos*) and was subordinated to a planned economy — much like any other village in the district — and were expected to meet demands of the annual socialist plan. Most of the villagers were employed in the state farm. A portion of men worked at the village's diesel power-plant that supplied the middle course of the Pyoza while the remaining inhabitants were employed in a service role that consisted of administration, transportation enterprises, communal facilities maintenance (primarily employing men) or education, staffing grocery store positions, and cultural work (positions primarily held by women). Simultaneously, in order to make a living, the villagers had to engage in other activities than those provided by the state. Along with the haymaking for the state farm, villagers also had to prepare hay for their own households and livestock. Men spent short vacations at their hunting or fishing grounds, procuring meat, furs, and fish — one of the most essential staples in the village before, during, and after the Soviet Union. Albeit private activity regulated by hunters' own purposes, social norms of the community, and one's household, hunting and fishing also contributed to the fulfilment of the socialist plan as the villagers

supplied the state-run stores both in the village and in the district's centre in order to secure some revenue for their own private expenses.

Shortly after 1991, Krecheulovo farm was reformed as a municipal enterprise and, since it was unable to secure any state subsidies and permanent revenue, ceased to exist. The village, along with the district, went into gradual decline. After the dissolution of the Soviet Union and abrupt state restructuring that followed, villagers faced regular shortages of consumer goods, blackouts, disruptions in the payments of state subsidies and salaries in which villagers had to rely on precarious formal employment coupled with seasonal hunting and other informal economic activities, such as logging or semi-legal entrepreneurship. It was during the late 1980s and early 1990s that Pyoza villagers started to become more frequent visitors to the fallout zones. Working for the cosmodrome or forming their own brigades, experienced hunters began to scavenge for space metal partly to provide for their families by recycling the scrap metal from the rockets or to use the material themselves such as manufacturing boats, sledges, furnaces, and grave fences. In this context, the space debris complemented the villagers' attempts to navigate their lives amidst social and political uncertainty of the (post-)Soviet crisis.

This thesis considers the significance of the villagers' personal engagements with the landscape of the fallout zones and space debris for individual agency and well-being in the times of uncertainty, offering a significant contribution to understanding the social changes and translocal dynamics that affect landscapes and people's lives in Northern Russia. The first chapter discusses the politics of landscape (Bender & Winer 2001; Tilley & Cameron-Daum 2017) — and the ways in which differing attitudes and values were assigned to the landscape of the fallout zones. I rethink space exploration by constructing the connections between human workings in Outer space and the encounters they engender in the terrestrial landscapes as well as transformations of the earthly places and social relations. I link it theoretically and empirically with the landscapes of the fallout zones in Northern Russia by discussing the manner in which different actors are involved in place-making activities with a particular focus on the establishment of spatial meanings — “the making of spaces into places implicated in

hegemonic configurations of power” (Gupta & Ferguson, 1997: 9). Here, I consider the role of a detached view of the Russian military-state authorities’ on the northern landscapes that supported their reconfiguration into the fallout zones. In doing so, I explore the conflicts that arise because of people’s different understandings and engagements with places and landscapes (Bender, 2006: 308) and account for the politics of landscape, integrating my study of the fallout zones into the anthropological discussion of power dynamics and the transformations of the terrestrial landscapes in Russia and abroad.

The second chapter presents the social and political context of the situated place making in the fallout zones — the post-Soviet crisis in the Russian North, the period when space metal scavenging emerged. Although the studies of landscape tend to focus on movement *within* familiar places, humans have always gone beyond familiar terrains, engage with unfamiliar places and create links between un/known places and spaces (Bender 2006: 309). The Mezen villagers have always hunted nearby the fallout zones, with their hunting grounds intersecting the ranges. However, there was no need to go beyond the familiar terrains and no interest in the debris until the crisis came and the ordinary geography of the villagers expanded enormously as they sought to sustain their households. Identifying the context of post-Soviet crisis, I demonstrate that the engagement with the landscapes of the fallout zones and the space debris was historically particular and imbricated in broader social and political–relations (cf. Bender, 2002). Simultaneously, I present the landscapes of the fallout zones as particular articulations of power-filled social relations, constitutive of the scavengers’ gender and other social identities during the crisis.

The third chapter scrutinises how people live and dwell in a landscape that is being altered by their own activities and simultaneously is heavily affected by the translocal processes engendered by space exploration. I conclude with an ethnographic account of the dwellers in the fallout zones and how they experience the landscape that has long been profoundly transformed by the space launches. Focusing on the fallout zones as places of processual nature, I discuss the manner in which the men setting out to the fallout zones in the 1990s were involved in place-making activities along with

other translocal actors and the manner in which these landscapes were encountered and perceived by the scavengers..

Theoretical and Methodological Framework

a. Fieldwork and Methods

For most of my interlocutors, I was not the first ethnographer they had met; the Mezensky district has been long popular with ethnographers and folklorists (Adonyeva et al, 2017; Kolpakova et al, 1967; Shrenk, 1855; Maksimov, 1871). However, I decided to add to the academic field of interest with a material perspective. Following Marcus' (1995) call to construct multi-sited ethnographic research, I started my work with a focus on the boosters and tracing them across various contexts by attending to the connections, associations, and putative relationships they engendered. Following the space debris as technical artefacts became the principal method for the construction of my research (though without much conscious reflection in the beginning), as I traced how boosters were moving across various sites — from the Spaceport and through the boreal landscapes to the Mezen villages and metal recycling points in the nearby cities. In this sense, I did not meet the expectations of my research participants as most of them anticipated me to be interested in the 'old culture' of the region. Nevertheless, when I explained that I came there to document people's current life situation, the interlocutors showed considerable interest in the political agenda of my research and ended up shaping the theoretical concerns pertaining to their ambiguous cohabitation with the Spaceport's infrastructure that I foreground in this work.

As I was constructing connections between the work of human projects in space and the fallout zones by noticing encounters with the boosters, I aspired to account for the preoccupations expressed locally that are situated in translocal histories and dynamics (Comaroff & Comaroff, 2003), raising the fundamental questions of exclusion, environmental pollution and ruination. In doing so, I position this research within a broader framework of critical anthropology of power and inequality (Ortner, 2016; Ong & Collier, 2005; Tsing, 2005), and, more specifically, in relation to the social

studies of Outer space and their engagement with structural and historical conditions that support human presence in space. The latter is an emerging field that has recently been developing in Russia (see Sivkov, 2019; Popravko & Tchalakov, 2020) and, thus far, no work has been done on the aftermath of space launches within the vicinity of space infrastructures.

Tracing the trajectories of rocket boosters and the local residents' sudden encounters with them, I spent seven months in the Mezen River basin during the years of 2017-2020. Most of my time was spent in the village of Krecheulovo, where I participated in the villagers' everyday lives and worked in the archives of the village administration. At times, I would travel along the Mezen River, all the way up to the Komi Republic, looking for other scavenger brigades. These field excursions allowed me to collect comparative data about the fallout zones and articulate how the Mezen villagers were entangled with these landscapes in different ethnic, cultural, economic and social settings. Most importantly, faced with the political stances of my interlocutors towards the work of the Spaceport, these visits contributed significantly to the activist agenda of my work which also led me to complement ethnographic methods and archival work with audio-visual methodology for collaborative work with my research participants. Photography and videography were used to reverse the analytical subordination of the visual to the social context, allowing me to elicit situated histories and relate to sensuous properties of the scavengers' experiences. This also became essential in making my work accessible and relevant to the lives of people within and beyond academia (see Tereshin, 2018; 2020; 2021a, 2021b).

Working in the rural communities that abut the fallout zones, I conducted qualitative research among space metal scavengers and other residents, employing semi-structured interviews to look into their encounters with the boosters and their contexts. Participant observation became the most significant aspect of my fieldwork in this circumstance; I lived for weeks at a time with the people in their village homes and hunting huts, participating in all of the activities as much as possible in order to understand and contextualise the hardships and joys faced by my friends and interlocutors. However, I have to acknowledge that my engagement with the villagers

was predominantly limited to the experiences of men scavenging the space debris, and thus, has shaped the focus of my work in a restrictive way that accounts for particular gender ideologies, distribution of labour, and identities. To a certain extent, this is owed to the fact that the men were affected in distinctive ways because of the crisis (cf. Ashwin & Lytkina, 2004), as were the women (cf. Ziker, 2010; Povoroznyuk, Habeck, & Vaté, 2010; Kulmala, 2010), but this deserves a separate study that falls beyond the scope of this Master's thesis.

Looking for my own niche in the host family's life, I came to learn how to behave and to nurture attentiveness to the unfamiliar by participating in every ordinary rural household activity as well as hunting, hay-making, and going to the fallout zones in the search of the boosters. Daily activities and brief discussions with people were documented in a field journal and parallel to these notes, I also collected essential and vital data through spontaneous, unstructured interviews while working or travelling. Furthermore, my work in the archives of local municipalities helped to expand these observations, turning to the correspondence of local residents and authorities with other state bodies held responsible for polluting nearby lands. Finally, regional authorities, workers of environmental NGOs, and brief encounters with Spaceport authorities were among the valuable interlocutors that contributed to the development of this work.

I believe that in my empirical, historical, and statistical data there are a few significant gaps. Although I spent many months in villages and in the city of Mezen, I was not granted access to all the information needed such as the particular documentation on the work of the Spaceport Plesetsk and supporting state bureaucracy. These aspects remained out of my reach, and thus, this work presents only a fraction of the patchy techno-political terrain of Russian space exploration that was more relatively accessible on the level of the mundane experiences of the space metal scavengers.

Following anthropological convention, I have used pseudonyms for all locations and individuals named in this thesis, apart from public figures and administrative centres.

b. Research Agenda

In my effort to address diverse perspectives that I have encountered and constructed over the course of my work, I focus on Russian space exploration and its terrestrial infrastructures in the Arkhangelsk region in order to pursue critical anthropological inquiry of their spatial arrangements. I aim to understand how “powerful institutions and ideas spread geographically and come to have influence in distant places” (Tsing: 2000: 336). Particularly, I look at the fallout zones of the Spaceport Plesetsk that were used to dump rocket boosters after launches. By addressing the fallout zones and the scavengers’ encounters with the space debris, I come to associate space exploration not only with popular images of modernity, extraterrestrial research, or human mobility, but also with consistent pollution, and political and ecological alienation. This allows the rethinking of the exploration of Outer space and its attendant littering of ever larger terrestrial spaces as an enterprise that extends human aspirations devastating life on Earth beyond our planet and back. In line with Ann Stoler’s (2013) argument about imperial formations as extensive relations of force thriving on a ruination that they cease to acknowledge, I propose that space exploration unfolds as an imperial project that “brings ruin upon” the northern territories, exerting material and social force that can outlive the project itself (Stoler, 2013: 11). I will argue that, along with a dynamic understanding of space infrastructure and the socio-material relations that facilitate its maintenance, attention to the boosters brings forth a critical awareness of the extensive power relations and processes of ongoing ruination behind the work of human projects in space. At the same time, fallout zones blur the boundaries and reveal the mundane interdependencies on space exploration that neither fit the ordinary planetary local and global scales, nor deprive the affected publics of their agency. While contaminating and destabilizing life in the vicinity of the space infrastructure, discarded rocket boosters provide new opportunities to sustain the lives of those affected by space launches.

I came to know the landscape of the fallout zones through everyday experiences of those who live in the villages that abut the ranges. I explored how people create a sense of familiarity with the fallout zones; how they moved around these places and

spaces; and how they were establishing the ‘moral possession’ of these lands. In doing so, I want to challenge the simple writing off of places and people by examining how the villagers are at once marginalised *and* are able to act upon the conditions they encounter as they scavenge to make a living from the space debris.

In some instances my engagement with the theoretical discussions presented in this text might seem redundant or less relevant to the main ethnographic line of inquiry of this work. Nevertheless, I believe it provides an essential context for deliberate critique of the reliance of Russian space exploration on waste and sacrifice of lands and human lives (cf. Lerner, 2010; Parks, 2013). This is an endeavour I did not plan to pursue at the outset of my research, but as I listened to and talked with my interlocutors, I could not overlook the concerns that they were bringing up. Therefore, in the course of my work I aspired to think about how I can acknowledge the agency of the people subjected to the systematic pollution and simultaneously account for the concerns they were raising in our discussions. I found it important to lay out an array of theoretical genealogies and simultaneously open up new objects and sites of politics (Barry, 2001) in the landscapes of the fallout zones by exploring how outer space and Earth are connected through numerous material, ecological, and technological processes (Battaglia, Olson, & Valentine, 2015; Olson & Messeri, 2015). Therefore, this work is also an investigation of how attention to the work of space infrastructure can problematise the extraterritorial social and material connections ensuring human presence in space.

c. Landscape and Politics of the Landscape

There is an abundance of literature exploring the landscapes; the topic is well researched and attracts various scholars in the field of Humanities from social and political anthropologists and geographers to historians. In anthropology, it was discussed as a process of meaningful interaction between humans and their perceived physical and visual form of an environment that affects how meanings are created, reproduced and transformed (Tilley, 1994: 25; Hirsch & O’Hanlon, 1995; Feld & Basso, 1996; Stewart & Strathern, 2003); as a lived experience, a series of relational places linked by paths, movements and narratives of their inhabitants (Ingold, 2000; Tilley,

1994); and as a materiality imbued with active agency (Tilley & Cameron-Daum, 2017). However, there is a tension between these predominantly phenomenological approaches centred on mundane human practice and political analysis of landscape as a visual representation — a symbolic ‘way of seeing’ (re)made through new technologies and representations (Cosgrove, 1998; Cosgrove & Daniels 1988; for discussion see Lounela, Berglund & Kallinen, 2019). In what follows, I amalgamate these theoretical strands to establish a perspective that elicits how these landscapes — the fallout zones of the Spaceport Plesetsk — were severely disturbed by the space launches and simultaneously shaped by the scavengers, who were taking hold of these un/familiar places as they sought to sustain their families salvaging the space boosters, and larger translocal social, economical and technological transformations.

To understand the manner in which the scavengers and their brigades were moving across the fallout zones, how they were involved in place-making activities and the manner in which these landscapes were encountered, inhabited, and understood, I adopt the dwelling perspective developed by Tim Ingold (2000). Ingold’s phenomenological approach attends to lived realities that give rise to personal experience and relations with the landscape and perceiving landscapes as moments in constant shifting relations of dwelling (Ingold, 1993; 2000). He grounds human intention and action within the ongoing and mutually constitutive engagement between people and their environment (Ingold, 2000.: 27). Here, akin to Bourdieu’s focus on habitus (1977; 1971/1990), attention to a set of routine social practices through and within which people experience and understand the world comes to the fore. We perceive and know the landscape through an education of attention and gather meaning in practical engagement with the landscape (Ingold, 1993: 153). From this perspective, “places come into being through praxis” (Raffles, 1999: 339), and as we actively engage with the world the landscape takes its form by incorporation into the practice of everyday life, becoming an embodied form of our activities (Ingold, 1993: 160-162; 165).

Drawing on Ingold’s work, I foreground the importance of everyday praxis and nurture attentiveness to its formative encounters in the fallout zones. This facilitates a

dynamic understanding of individual agency of people caught up in a world not of their own making (cf. Giddens, 1979). In addition, the dwelling perspective is valuable for its understanding of the environment as an outcome of contingent human and non-human entanglements born out of engagement and interaction (Ingold, 1993: 160; see also Descola, 2013). This, as will be demonstrated, will prove to be crucial in the comprehension of the scavengers' entanglements with the space debris in the fallout zones.

Fallout zones can be understood as growing in the mutual involvement of people, other beings, and materials — space debris, forests, their soils, animals and plants — in an environment (cf. Ingold, 2000: 347). The Mezen' villagers were gaining an intimate knowledge of these landscapes as hunters and later as scavengers — moving between places and along hunting paths, looking for the game and boosters, and establishing new grounds for one's enterprise. In this process, as land, space, movement and everyday praxis of the scavengers were coming together, the landscape of fallout zones emerged.

But is this enough to understand this process? Phenomenological perspective can fall short describing the fallout zones at a scale of situated activity. This single focus on a “wayfinding” through a world that is set in continuous motion (Ingold, 1993: 155) is insufficient in describing how our engagements with and movements within a landscape may be prompted or affected by personal experiences of crisis and abrupt uncertainty. Similarly, it tells us nothing about how people develop specific dispositions and sensibilities in relation to the disturbed landscapes subjected to systematic pollution and shaped by the actions of those who have never attended to the features of northern environments by the means of their own practical engagement. As Barbara Bender states it, such a situated approach risks “of focusing too sharply on social practices or practical activities and of failing to note [their] embeddedness in often deeply unequal and widely disseminated power relations” (Bender, 2006: 306–7; see also Emery & Carrithers, 2016).

In contrast to the phenomenological perspective, cultural geographer Denis Cosgrove (1998: 269) developed the notion of landscape as an ideological construction,

a restrictive way of seeing the world projected onto land “that diminishes alternative modes of experiencing our relations with nature.” In his later study of the Apollonian eye provided by the work of satellites (Cosgrove, 2001: x), he elaborated how “disinterested” viewpoints above the Earth and “objective” representations it forms may have agency in shaping understanding of the world and human action within it. In line with this argument, other scholars studying technologies of remote planning demonstrated that the mapping of earthly landscapes, environments, and their resources is a political act open to a new distribution of power and knowledge (Herscher, 2014; Warf, 2012; Harris, 2006). As argued by James Scott (1998), abstract knowledge produced by states through mapping and other categorisation practices may simplify, misrepresent, or even obscure complicated intimate knowledge and practices, engendering specific regimes of perceptibility or epistemological regimes that frame our engagements with the land.

This multi-scalar experiences and representations of the landscapes transform places, personal experiences and intimate knowledges of those dwelling within (cf. Lounela, Berglund, & Kallinen, 2019; Bender, 2006; Raffles, 1999; Gupta & Ferguson, 1997). Localities that may appear rooted and familiar, in fact, operate as a set of continuously shifting relations in which places are materialised and enacted by the practices, discourses and imaginations of variously positioned actors and political economies (Raffles, 1999: 324). Therefore, if we want to understand the landscape of the fallout zones we cannot do away without meticulous attention to the politics of environmental transformation associated with the work of space infrastructures on Earth.

In this light, a different kind of the anthropology of landscape proposed by Anna Tsing (2015) is crucial in intertwining the research strands discussed above. In *The Mushroom at the End of the World* she aims to understand the long-distance destruction of landscapes and ecologies on the Earth, critically reflecting on alienation and ruination of landscapes as a feature of modernist projects that turn people. These capitalist, extractive, colonial projects defined by their aspirations to turn things and landscapes into resources or mobile assets, which can be removed from their life worlds, obviate

living-space entanglement (e.g. converting the landscapes of South-East Asia into palm oil monoculture plantations for the purposes of the global capitalist market). She argues that although some modernist projects rely on the consistent alteration of landscape for the production of singular assets, they bring disturbance — a change in environmental conditions that give rise to new assemblages, opening up the terrain for transformative encounters, changing social, economical, political relations, as well as the landscapes and the ways of being nurtured within these landscapes (Tsing, 2015: 160). Disturbance in the landscape engender profound socio-ecological changes, which in turn, open up the landscape to the new relations and more-than-human assemblages (Tsing, 2015: 28-29).

Thinking through disturbance-based ecologies helps us to conceive the landscapes of the fallout zones as altered and co-produced by translocal configurations of political power along with other situated activities. Most importantly, it brings what happens after the disturbance to the fore — the entanglements or assemblages of the scavengers with the space debris that are caught up in changing relations of power. In this sense, space exploration is a large-scale project transforming material flows and inter-species relations in processes that aspire to extend from the most intimate landscapes on Earth into the infinity. Here, space infrastructures, Spaceport Plesetsk included, are built networks that connect and disconnect across these multiple locations and scales, working within situated contexts and often constituting and reflecting particular ideologies or material politics. Simultaneously they are things and the relations between things caught up within the workings of social, cultural, economic and political arrangements, structures, and technologies (Larkin, 2013: 328). In the case of the fallout zone, I postulate that Russian presence in space cannot be maintained without disturbance of the northern landscapes — ruination and pollution are at the core of the fallout zones' emergence.

The disturbances spawned by space exploration in Northern Russia are constitutive of more-than-human encounters and suggest how diversity and indeterminacy of the landscapes polluted by space debris can provide us with an example of a way for staying alive in precarious times. With this perspective in mind, I

propose to shift analytical focus to how the movement and action of the scavengers were engendered in the 1990s' Russian North by translocal process, simultaneously foregrounding how the boosters can be approached as non-human actors bringing the disturbance or ruination, while being constitutive of the landscapes and human attempts to navigate their lives amidst abrupt uncertainty of the (post-)Soviet crisis.

Thus, I approach landscapes as both imaginative and material; they are historically specific gatherings that are not limited to a single individual or particular locality, but extend beyond and encompasses a variety of encounters, cultural and political commitments (Tsing, 2019). They are politicised, culturally relative, historically specific, local and multiple constructions (Rodman, 1992). From this perspective, there is no one absolute landscape, but “a series of related, if contradictory, moments-perspectives which cohere in what can be recognized as a singular form: landscape as a cultural process” (Hirsch & O’Hanlon, 1995: 23). Therefore, in Lefebvre (1974) terms, this thesis stages a dialogue between ‘spatial practice,’ the way spaces are generated and utilized and ‘spaces of representation’ produced and modified by practical activities of their inhabitants.

CHAPTER 1. Rethinking Space Exploration

1.1. Space Infrastructures

My interest in the Russian space infrastructure builds on earlier approaches in the field of Science & Technology Studies that urged us to understand how modern technologies can be involved in the post-colonial critique of the “universal” mind, recognising the borderlines and hybrid conditions of modern science (Anderson, 2002). I am inspired by Bruno Latour’s (1993; 2007) conceptualisation of actor-network theory as it helps to conceive science and space exploration as contingent and situated projects constantly naturalised through situated processes, assembling humans and things. However, in this work, my interest is not solely limited to deconstructing the solid appearance of the multi-scalar networks of space exploration. Kim Fortun (2014) contended that the complexities of late industrial systems and knowledge, relying on established idioms and dominant ways of thinking, produce discursive gaps and risks, as they ignore violent dynamics and dangers posed by the work of hazardous projects (2014: 313). Attending to language ideologies intrinsic to their maintenance, she advocated for an experimental inquiry that would discern habits of mind, language, and regulation, which could provoke new ways of thinking and create a space to stage deliberate encounters, troubling the work of modernist projects (Fortun, 2012: 452).

Following Fortun’s arguments, I find it crucial to account for the meanings and values assigned to the Northern landscapes in the context of the Spaceport infrastructural development and fallout zones designation, where planning of the state-military actors reinforced particular cultural and political representations of a landscape, profoundly affecting perceptions and experiences of those dwelling within it. I foreground how infrastructures, being caught within social, economic and political arrangements, can lead to certain forms of violence, exclusion, and inequality (Rodgers & O’neill, 2012). Thus, I advocate for an approach that sees infrastructures as a terrain

for the negotiation of moral-political questions, mediating specific ethico-political projects, their aims and expectations (von Schnitzler, 2013).

Now, as I ponder these key theoretical problems, I will turn to the particular encounters troubling space exploration that will prove to be crucial in understanding the development of space infrastructure in the Arkhangelsk region. This allows putting forth the case of the Spaceport Plesetsk and its fallout zones on an equal footing with the international studies of space infrastructures. In the short review I will present below, my point is to sketch with a broad brush a set of themes that I consider important to understanding how infrastructures for space exploration, becoming an embodiment of earthly colonial aspirations, spawn exclusion and socio-material inequality as they unfold.

The work of Peter Redfield, who studied the Kurou Spaceport in French Guiana (2002), can offer a crucial connection between the state ideologies and the actual practice of spaceflight infrastructures. In addition, it offers a methodology that helps to move from general discourse to a specific practice. Building on the work of Chakrabarty (2000), Redfield urged to provincialize Outer Space, scrutinising the language of space exploration that inherits the notions of inexorable “progress of mankind” and colonial conquest, suggesting discursive frames that mediate how we perceive objects and subjects we engage with. To provincialize space exploration is to acknowledge the specificity of its earthly assumptions, desires, and fears, affirming historical connections between exploration on Earth and beyond (Ibid.: 799). Elsewhere (2000; 1996), Redfield demonstrated how the Spaceport as part of a global network extends the new extraterrestrial frontier down to the ground, reconfiguring terrestrial places both in their relation to the cosmos, and to each other, via this space link. In the context of The Guiana Space Centre, the establishment of space infrastructure recombined technical practice with the elements of imaginative discourse lingering from colonial times. Once designated for penal colonies, Guianese landscapes were repositioned as valuable outposts to launch satellites into orbit. At the heart of this process was the actual technical practice and imaginative discourse of French officials and Spaceport’s authorities, who, once again, represented Guianese lands as empty and remote frontiers.

Likewise, similar logics of colonial history and perception inherited by space exploration were uncovered by Alice Gorman (2005; 2019) in the case of Woomera, an Australian Spaceport that was established in the place of territories expropriated from aboriginal people. She described how, from the perspective of the Australian authorities, both interplanetary space and the lands of ‘primitive’ people are seen as *terra nullius*, moral vacuums into which civilised space-faring nations can bring the right moral order, mirroring colonial aspirations both on Earth and beyond (Gorman, 2005: 98-99). In the same vein, Sean Mitchell in the case of Alcantra Spaceport (2017) vividly described how the utopias of Space flights were inflected by inequality and the imperial ambitions of a Brazilian state backed up by prospects of a universal humanity. Paying particular attention to the reconfiguration of land use regimes and racial politics, he demonstrated that, although the space technologies were framed as promising a common good for everyone, the technoscientific and military power of these projects was monopolised by a few. In addition, he showed how the construction of the Spaceport was dependent on an undoing and recycling of existing institutional orders; namely, at the heart of these processes was a resettlement of the local communities from remote areas, now designated for the launch pads, to inland agrovilas.

I suggest that these accounts of frontier dynamics can be productively linked to the concept of territorialization (Vandergeest & Peluso, 1995) as it unravels how particular state language and a set of governmental techniques facilitate the construction and operation of modern technology. As Rasmussen and Lund (2018: 388) argued, the discursive, political, and physical production of frontiers as “vacant,” “natural,” or “uninhabited” spaces makes way for acts of territorialization — “excluding or including people within particular geographic boundaries, and controlling their actions and formal access to these areas” (Vandergeest & Peluso, 1995: 388). This is precisely the issue that we can notice in the absorption of the frontier spaces by the expanding space infrastructures presented above (and in Russia, as I will demonstrate in the next section). Attention to spatial politics and technosocial encounters coupled with an acute awareness of discursive practices foregrounds how infrastructures, operating on the level of fantasy and desire, encode the dreams of various actors and become the vehicles that transmit and make these dreams real (Larkin, 2013: 333). At the same time, we are

reminded that, although infrastructures shape the rhythms of social life, discourses and language give form to infrastructures as much as their material components (Anand et al, 2018: 9).

In what follows, demonstrating how places are being produced discursively and materialised through practice, I acknowledge the discursive gaps (Fortun, 2014) engendered by dominant narratives of the Soviet and Russian military-space authorities that ignored how the space program led to a pollution of the Mezen landscapes. In my attempt to scrutinise the work of space infrastructure in Russia and its aftermaths, localisation becomes a political project. It reveals how terrains hidden behind the main centres of techno-scientific production are recontextualised as “wild” spaces, dissolving existing social orders and re-ordering objects and subjects anew (Rasmussen & Lund, 2018). This grounds Russian efforts to “conquer” Outer Space in local struggles with environmental precarity. In addition, it brings forth contingent processes of organising modern knowledge and power (Foucault, 1980) concerning the territorial distribution of modern technology and its influence outside the main centres of techno-scientific production (Klinger, 2019).

I turn to the margins of the Plesetsk’s infrastructure, connecting the work of the main launch site with the landscapes of fallout zones along the Mezen river, where the rocket boosters were abandoned by the military soon after launches — the landscapes where the disturbance engendered by the space launches comes to the fore. One of the key arguments I bring forth in this chapter is that, unlike the spaceports, fallout zones make us aware that the Russian space program does not simply reconfigure the landscapes of the state peripheries in the Arctic, but it relies heavily on the creation of waste and “wasted” lives (cf. Bauman, 2004; Schönle, 2005: 653) as space exploration is inevitably linked to the production of debris and certain forms of ruination.

Therefore, I propose to locate and specify the fallout zones in their relation to socio-material connections between human and other-than-human actors (cf. Müller, 2015) that reify Russian endeavours to access and utilise space. In this light, the fallout zones belong to a wider space infrastructure and, together with the spaceports, become the constitutive nodes (Peldszus, 2020) in the constant work of human projects in space.

From a methodological perspective, the boosters' social lives and biographies of circulation (Appadurai, 1986; Kopytoff, 1986) can be taken as a point of departure for making salient their entanglement with discursive formations, ideologies and politics within broader framework of space exploration. The boosters themselves provide us with a unique possibility to disentangle the ties to particular localities of the spaceports and embrace the movement of matter, reminding us about the processual quality of space infrastructures. At the same time, as we move away from the Spaceport into the landscapes of the fallout zones, they insistently remind us about their connections to the bigger social, political and technological processes of place-making.

1.2. The Northernmost Spaceport

In 1957, near the small village of Plesetsk in the Arkhangelsk region, located a thousand kilometres to the north of Moscow, a military range called “Angara” was established to test intercontinental ballistic missiles. By the early 1960s, following the development of the Soviet space program, it was redeveloped and turned into an experimental operation centre for space rocket systems launching satellites to strategically important orbits. The Spaceport was located at 63 degrees northern latitude, making the launches more costly compared to the equatorial launch sites. However, it allowed satellites to be placed on polar orbits — the orbits passing over the North and South poles — ensuring the complete coverage of any point on Earth within a certain time period and securing possibilities for surveillance, weather monitoring and imaging of Earth's surface.

The establishment of the Spaceport became one of the aspects of an accelerated modernisation agenda in the Soviet North (cf. Thompson, 2009; Pedersen, 2011; Bolotova, 2014; McCannon, 1998). For state officials and journalists, the development of the northernmost Soviet Spaceport was seen as part of a broader idea of “mastering the North” (*osvoenie Severa*), as it aligned with the state modernisation plans and large-scale infrastructural building in the country's remote areas and the circumpolar North in particular (Schweitzer, Povoroznyuk & Schiesser, 2017). Similarly to Scott's (1998)

concept of high modernism, the construction of Plesetsk became another example of the expansion and development of Soviet scientific and technical knowledges, promoting rational design of social order and increasing control over nature (see Siddiqi, 2010; Russia's northern Spaceport, 2007). Thus, the emergence of the Spaceport coincided with other “dynamic and congealed processes of organizing finance, knowledge, and power” (Anand et al., 2018: 10) at the circumpolar North — from development of the Northern Sea Route to the construction of Baikal–Amur Mainline.



FIGURE 2. The detachment of the first stages of the “Soyuz” rocket after the launch from the Spaceport Plesetsk. June, 2018.

The Spaceport's infrastructure in the Arkhangelsk region required enormous spaces for its main facilities: the launch site and the fallout zones. For instance, the establishment of the fallout zones for rocket fragments falling back to earth covered an area of 140 000 km², of which about 67 000 km² were considered inland territories (Russia's northern Spaceport, 2007: 74). Among other reasons for placing the space infrastructure in the Arkhangelsk region was safety of the local population. Flight trajectories were passing above sparsely populated areas and were located at least fifty kilometres from the nearest settlement. Starting from the first launch of the Cosmos-112

reconnaissance satellite on 17 March, 1966, more than 1,500 launches have been made from Plesetsk (Russia's, 2007: 116), accounting for about 12,000 boosters dropped to the fallout zones (Figure 2).

The dominant Soviet discourses portrayed nature as a passive and pointless matter that gains its meaning “only through the activity of man, who endows a sense for a certain locality through the construction of certain objects” (Bolotova, 2014: 47). Likewise, the perception of the landscapes designated for the boosters' disposal followed similar logics of a wild nature that must be put to good use. Thus, as the boreal forests and tundra of the Arkhangelsk region were rediscovered as advantageous places to reach polar orbits, the meaning they were endowed with was that of a scrapyard to dispose of the space debris (Figure 3).



FIGURE 3. A booster lies in the forest nearby the Mezen river. Courtesy of Albert. V. Loginov. July, 2001.

Starting from the very first years after the Spaceport's construction and continuing onto the present, military-state authorities have been predominantly concerned with conquest of space and winning the battle against nature in the North, rather than dealing with environmental pollution in the spatially remote areas. Although,

at first, the space infrastructure was classified, the use of these areas nowadays is subject to an agreement between the Russian state and the Federal Space Agency (*Roskosmos*). It is backed by the decree, regulating procedures and conditions of occasional use of the fallout zones for the detaching boosters. Still, the legal definition of these areas remains unspecified and the Spaceport officials rarely abide by the law in its totality. In this context, one of the main issues with the fallout zones becomes the unwillingness of the authorities to clean the lands from the aftermath of space launches. The boosters are tracked and mapped by the military, but still end up abandoned in the fallout zones, as the Spaceport officials evade land cleansing, proclaiming the absence of sufficient funds. Issues of environmental pollution, financial reimbursements for the affected municipalities or procedures handling possible risks related to the Spaceport remain unregulated as well (see Malygin, 2013).

At the same time, space authorities and local villagers have diametrically opposing views regarding the landscapes of the fallout zones. The former see it as an empty land that must be used to achieve state ambitions in space, while for the latter it is the landscape saturated with familiar and intimate places endowed with personal meaning and enmeshed in the broader rural networks as part of the villagers hunting grounds (Figure 4). During Perestroika, the declassification of the Spaceport's work and establishment of a military ecological department coincided with growing discontent among the local population. Persisting anxiety about pollution with the rocket fuel (see Sidorov, Sovershaeva & Serebtsova, 2006) coupled with general discontent regarding state policies in the context of their increasing fragmentation after the collapse of the Soviet Union (cf. Thelen & Read, 2007). Amidst the growing ecological movement in the late Soviet Union and regionalist movements in the North, local villagers started an ecological campaign in local media. Their daily encounters with the boosters provoked awareness about the role of the Spaceport in polluting the northern territories and encouraged them to demand recognition as an affected public.

These observations can be linked to a similar conflict that was described by Ellen Power and Arn Keeling (2018). They examined the reentry of the nuclear-powered Soviet satellite Cosmos 954 in the Northwest Territories of Canada; where, as the

recovering mission unfolded, the tensions between local communities, state officials and scientists worsened. Drawing on the work of environmental historian Michelle Murphy (2006), the authors proposed that at the heart of this conflict were different regimes of perceptibility of the northern landscapes — “the powerladen configuration of cultural and technological things and relations that make certain phenomena or effects visible (or “real”) while dismissing or marginalizing others” (Power & Keeling, 2018: 87). Similarly, as is in the case of this research , the dominant discourses of the Spaceport’s officials failed to reflect on barely reflected local perceptions of environment and villagers’ growing concerns, as they privileged technoscientific agendas of Soviet and Russian space programs over extensive relations of locals with the surrounding landscapes.



FIGURE 4. A hunter poses atop of the booster found near his hunting hut in the Mezensky District. Courtesy of Vladimir. F. Lokachev. 1984.

In the case of the fallout zones, placed in the boreal forests and tundra of Russian North, we can see how these landscapes were discursively produced as remote areas, redefined and repositioned in relation to polar orbits as valuable locations suitable

for an unfolding of space infrastructure. Similarly to the cases of other space infrastructures, we can infer how the implementation of the Russian space program tends to ignore the complex relationships between communities and the landscapes designated for fallout zones. In a similar manner to Fortun's (2012: 452) description of modernist thought styles, idioms produced within dominant discourses on space exploration ignore the contribution of space programs to the ruination of the landscape, obscuring people, their ideas about and relations with the landscape. However, attention to the spatial distribution of the Spaceport infrastructure constructed by military-state authorities elicits translocal configurations of power transforming places, personal experiences and intimate knowledges of the Mezen villagers.

The fallout zones in Northern Russia serve as unique examples of the vast national inlands turned into scrap yards for space debris. Producing sensorial and political experience, they become critical sites translating politics from a rationality to a practice (Anand et al., 2018). What makes the fallout zones stand out from other cases is that, thanks to the boosters movement, I can picture the space infrastructure in a way that acknowledges demands of the local communities to be recognised as part of a broader process of space exploration. Guided by these technological artefacts, I am able to construct connections between the work of human projects in space and the unfolding encounters in the fallout zones that are "intertwined within changing relations of power, culture, and space" (Warf, 2012: 101).

As we consider how materials and technologies are endowed with agency and become political — advancing space exploration or subjecting remote communities to systematic inequality and environmental pollution — we can create a possibility for critique and contestation of the socio-material order intrinsic to space exploration in Russia (cf. Barry, 2001: 9). Thus, space debris links endeavours of the Russian space program with translocal encounters and contexts, and helps to stage a critique of the spatial arrangements that supports aspirations of the Mezen villagers to acknowledge inequalities spawned by the work of the Spaceport's infrastructure.

CHAPTER 2. Making a Living in the Fallout Zones

Now I turn to the space debris as remains, material and social afterlives of space exploration in the fallout zones. In doing so, I aim to continue rethinking space exploration as inevitably linked to the process of ongoing contamination and consistent pollution. However, following my endeavour to acknowledge the way space exploration binds human potentials to degrading environments on Earth (Stoler, 2013: 7), and “conjure up critiques of present arrangements and potential futures” (Edensor, 2005: 15), I am not approaching fallout zones solely as ruined sites of abandonment or contamination.

In this chapter, I attend to the fallout zones as “sites in which the becomings of new forms, orderings and aesthetics can emerge” (Edensor, 2005: 15). First, setting space exploration aside, I will sketch the context of the post-Soviet crisis in Northern Russia. Then, I demonstrate how fallout zones for rocket boosters became “places of imaginative possibility” (Reno, 2020) for the space metal scavengers, who set out to the fallout zones, looking for a chance to sustain their households after the end of the Soviet Union. I will argue that the indeterminacy of discarded boosters and the disturbed landscape provide a path for unexpected world-making projects to emerge (Tsing, 2015; Reno, 2020). Thus, I hope to account for how the neighbouring communities are at once marginalised and capable of acting upon the conditions they encounter, and how engagement with the boosters forms affective relationships formative of the scavengers identities, and bringing a sense of hope and opportunity in future-making practices and resilience (Jaramillo, 2020).

2.1. Times of Crisis

After the end of the Soviet Union, villagers of Krecheulovo, one of the numerous small Russian villages located along the Mezen river, faced a period they call “*perestroika*”, alluding both to the well-known period of social and political changes promoted by Gorbachev and stressing its interminable and protracted character. Most commonly, the locals use this term to refer to the period after 1991, when they faced a substantial restructuring of existing social and political institutions and major changes in the state’s policies.

As it was explicitly demonstrated by other scholars, in the beginning of the 1990’s, the Russian state started to engage in multiple processes of retrenchment and liberalisation, provoking a partial dismantling of its welfare programmes (Cook, 2007: 10). The sense of abandonment by the state started to shape people’s experiences of these transformations, creating the impression of a social security “vacuum” in rural towns and villages of the Russian North, as the social guarantees, securities and services previously provided by the state shrank or became less reliable (cf. White, 2004: 151-153). Overall, the experience of the crisis in Krecheulovo slotted into these wider trends of reorganising governance and social care in rural Russia. The collapse of the planned economy brought disruptions in provision of goods and maintenance of infrastructures from roads to electricity grids. In addition, socialist state authorities, whose presence was felt the most in the remote areas, started to dissolve or were reorganised. New ones, introduced by the Russian state, weren’t adjusted yet to the constantly changing conditions or lacked power and authority to affect what was going around.

As in the broader post-Soviet contexts (Knudsen, 2015; Humphrey, 2018; Ries, 2002), personal expectations related to the waves of reforms and long-lasting processes of state restructuring failed to materialise for the Mezen villagers. The collapse of the Soviet Union and partial elimination of its key policies resulted in a disruptive political, legal and socio-economic climate. Former workers and peasants faced decreasing standards of living, health problems, and downward mobility. They became constrained by ineffective representative institutions, and a loss of the symbolic capital previously

connected with their work. Their limited knowledge about and access to the labour market only worsened growing feelings of insecurity (Knudsen, 2015).

Moral indignation and righteous anger, related to daily injustices and failing expectations about one's rights in society (Narotzky, 2016), brought about a mixture of political and moral economy as a dynamic combination of norms, meaning and practice (Palomera & Vetta, 2016). As the villagers felt that familiar norms of reciprocity were violated, they started to question their relationship with the state and previous social and political arrangements (Scott, 1976: 187-188; Sabaté, 2016). This was followed by a changing understanding of social security that was "based on a combination of past experiences, on promises encapsulated in existing mechanisms, in entitlements and the continuing availability of resources, and on some estimations of future developments" (von Benda-Beckmann & von Benda-Beckmann, 2000: 17). Enmeshing state and non-state, personal, private and public sources, the Mezen villagers started to develop social relationships and strategies in order to mitigate risks and produce some sense of social security for themselves, their close ones or communities in general (cf. White, 2004: 153). Similarly to other neoliberal trends in Europe (Spyridakis, 2006: 161; Cabot, 2016: 153-154), a hegemonic structure of employment based on the exploitation of every weakness of the law and absences of inspection and state control of labour conditions became a new norm in the Arkhangelsk region.

By 1994, the local Krecheulovo collective farm was shut down and most of the villagers were left without salaries. From the point of formal employment, the village men were hit the hardest, while women were able to secure their places in the state cultural and educational institutions left in the area, where they held the overwhelming majority (see Povoroznyuk, Habeck & Vaté, 2010; Kulmala, 2010). Feelings of insecurity and general distrust in the remaining precarious formal employment, followed by the continuing perception of themselves as the main breadwinners in a household, led the Krecheulovo men to choose informal employment. This formed a circumstance in which informal networks of reciprocal support and care along with creative combinations of formal and informal income from the state and private

economic activities (Benda-Beckmann & Benda-Beckmann, 2000: 17) became some of the main ways to make ends meet during the crisis of 1990's.

This context, along with continuously worsening economic conditions, led locals to a critical assessment of existing state institutions and regulations. In line with Henrik Vigh's theorisation of crisis (2008: 18-19), the fragmentation and instability of social lives that followed the collapse of the Soviet Union brought about continuous critical assessment of one's positions and possible futures. As the villagers sought to navigate their lives in crisis, their feeling of insecurity and indignation led them to believe that, under conditions of crisis, they have a moral right to disobey the law, to make uncontrolled and informal use of surrounding resources or state property, and, sometimes, to contest the state monopoly on violence (see next section).

Thus, critical assessment of the present conditions and the social environment provided the villagers with a way to cope with the crisis, pursuing "a life worth living" (Narotzky & Besnier, 2014) based on principles and assertions shared and supported by community members. In this context, the encounter and consequent entanglement between villagers and space debris played a crucial role in making a living under conditions of permanent uncertainty.

2.2. First Encounters

On an early January morning, I am in a snow-covered pine forest on the border of a huge swamp, stretching between the currents of Mezen' and Pyoza rivers. I am standing atop a large cone-shaped grey tank with a bright blue sticker "Rocket-Space Centre Progress" on its surface. For the next hour, my companion and I, whom I will call Nikolai Anufrievich, will slide along the smooth sides of the Soyuz rocket booster, shoveling the snow. After we have finished cleaning the boosters, Nikolai rips up the rocket body with a chainsaw and invites me to see the boosters inside. A moment after, he tears off one of the wires hanging inside; hands it over to me and points to the mark, explaining that the booster has been lying in this swamp since 1991— the year he first came to the fallout zones.

That was the year when Krecheulovo hunters found the first stage of the “Soyuz” rocket that fell into the river near the village. Concerned with the possible risk of contamination in the river, the village Council and the district administration approached the cosmodrome with a request to carry out an ecological inspection. Soon the military arrived with a helicopter and asked one of the hunters to show them the crash site. Nikolai, who worked in the village on the radio node at that time, was among the passengers on this flight.

I wanted to explain why I had actually headed off. We filed an application, the first rocket was found in a swamp [nearby the village], where the fuel was already draining into the river. Somehow, we finished with all the formalities and applied to the village council from there, and then—to the district administration, the administration contacted Plesetsk, informing them that the rockets were really very close. We found it about thirty seven kilometers [away] and it was draining straight into the river. The military provided a helicopter. We showed exactly where it was, the spot where it was lying. We flew over the area and saw that there were lots of rockets. D. showed no interest in it, but I did. The next winter I had already headed off to look for them on my own. (An interview with Nikolai. June 25, 2018)

On their flight over the surrounding forests, Nikolai saw dozens of other boosters left in the forest for the past few decades, grasping the enormous scale of the fallout zones. A view from above provided Nikolai with a new and valuable perspective, for even the old maps in the village council were classified, depicting the Pyoza forests and swamps as blurred patches. Most importantly, he realised that his hunting hut was just on the edge of the fallout zones. Soon after the flight, he made approximate marks on the old map he borrowed from the village council and set out to the fallout zones, looking for the precious metals to be recycled. However, Nikolai was still constrained by his working shifts at the radio station. So were the others; most of the villagers had no time to go deeper into the forests as they only had two days off during each week. Although his work did not allow Nikolai to leave for long, he found an opportunity to swap shifts with colleagues and began to spend more time in the fallout zones searching

for the rockets. As an experienced hunter he had no problems identifying approximate boundaries of the ranges and living for weeks in the taiga. Drawing on his experience of work with radio equipment, he assumed that boosters might be full of valuable wires plated with gold (Figure 5), and, consequently, once they were found it was easy enough for Nikolai to figure out which parts to look for and where to sell them afterwards.

I left for three or four days. There were cases when they lost me, well, different things happened. I got out on autopilot, found myself drowning in a swamp, and came across bears. Well, it was good that I had dogs there with me, so it ended up well, I came out alive . . . I was already familiar with those places and used a map and a compass for navigation. GPS was not available then, there was nothing. A map, a compass — and that's it. And the sun. Here I am, alone, the numbers were not impressive . . . I was hunting for contacts that could be sold as radio parts at the stalls. (An interview with Nikolai. June 25, 2018)



FIGURE 5. Disassembled gold-plated contacts from a “Soyuz” rocket stage. June, 2017.

Nikolai was the first person in Krecheulovo who saw the boosters not as a mere pile of metal debris, but as a useful catch that could provide some additional income for

his family. This is just one of the examples of how the fallout zones began their fusion with an expanding web of relations within the landscapes where local villagers hunted, fished, and, subsequently, began to scavenge boosters. However, in the beginning, the boosters and the hunt for contacts hardly attracted Nikolai's fellow villagers. Their interest in the scrap metal began to grow rapidly after he tried to use a piece of aluminum sawed from the body of the booster as the basis for a sledge. First vehicles constructed by Nikolai provoked interest among his neighbours. Soon after, others went to the fallout zones, looking for the twenty-meter long cone-shaped fuel tanks to cut off a piece of their body or to get some spares to use in the household. Since then duralumin sheets cut from the hull became a reliable and high-quality material for making sledges and boats, while leftovers of the boosters were also used to make shovels, gutters, cellars, stoves, and cemetery fences. In a decade most of the wooden boats were replaced by new lightweight, fast and durable boats without additional costs. The space boats inherited the design features of the various types of wooden boats used in the Mezen basin and were soon named "*raketa*" — a rocket (Figure 6).



FIGURE 6. Families travelling down the river in boats built from cosmic metal. August, 2019.

The high level of trust within a small community interwoven by close kinship contributed to the rapid dissemination of new knowledge about the landscape of the fallout zones and the possibility of using the boosters for the public good. At the same time, the large number of boosters in the forest and the difficulty in harvesting them individually did not lead to intense competition between those interested in the space metal.

Hunters who had gone deep into the woods had encountered the boosters falling in the vicinity of the village before. Even though most of the village men were involved in hunting, not everyone had the opportunity to go into the woods for a long period of time, for the obligation to work five days a week at the state farm did not allow them to go to the places as far as the fallout zones. However, faced with constructive dismissals and shortage of income, men still had to look for new ways to make a living and simultaneously compensate for the abrupt loss of status to meet their own and others expectations of proper breadwinners for their households (cf. Ashwin & Lytkin, 2004). In this context of the gradual decline of the state-ran economy in the district and of an unusual abundance of time that must be sacrificed in order to make a living, the everyday geography of the men expanded enormously. They had to hunt not only to provide food for themselves and their families, but also to secure some revenue for the fuel, maintenance of the snowmobiles or for their kids studying in the regional centres. This required men to cover longer distances seeking out animals in the forests and tundra, in addition, this spatial expansion required new technologies: snowmobiles, radios, and other technical equipment to make one's life in a hunting hut more comfortable. Thus, all of these affected the radius, mode and speed of their movements after the collapse of the Soviet Union.

Therefore, contrary to Ingold's (1996b) argument that hunting strategies are not tied to a particular economic or political setting, in this case the specificity of the post-Soviet condition intensified the change in the ways people were making a living. Following the drastic social and economic changes described above, most of the men in Krecheulovo switched to temporary employment and informal activities. They combined their income from permanent jobs or pension with occasional informal jobs,

and most of those were related to extensive appropriation of surrounding resources — the boosters became one of them. This could be exemplified by the story of one of the most prominent scavengers of Krecheulovo, Andrei Fedotovitch:

I was a labourer on a state farm until it fell apart. When state farms were still operating in Russia, we had already ruined everything here. So I went to trade. Commerce. Buy and sell. Transporting goods, fucking suffering. Mostly I did it for nothing, — to get some work experience [for future pension], for no reason. [I] was mostly fishing and hunting. That's when we started [to collect] iron, when the state farms collapsed, we were picking up all the [leftover] iron. That damn scrap metal, aluminum. Before, when the state farms were around, they didn't pay attention to that copper, aluminum, stainless steel. And then what, we have picked up all the extra stuff, so we went for the fucking rockets.(An interview with Andrei January 18, 2019)

The country-wide market transformations were changing resource values in the North leading to the commodification of available resources on a scale that had been unthinkable before (Nakhshina, 2012: 138). Space metal scavenging was part of these trends — the space debris progressed from the household material to a new valuable resource and commodity. Together, these broad changes and an array of more or less contingent events related to the encounters with the space debris created previously unavailable opportunities for the men who were knowledgeable enough and able to control access to rural resources. When sold, the income from several tons of aluminium together with dozens of kilos of titanium and copper, easily collected during three or four months, was almost higher than the average annual salary in the village school. Thus, space metal scavenging soared by the end of 1990s.

2.3. Organisation of Labour and Legal Status

Encountering the debris, scavengers had to negotiate their ambiguous qualities as il/legal. In order to get the scrap out of the fallout zones and secure the revenue, the debris, legally the property of the Ministry of Defence, required a certain degree of

versatility in positioning oneself in relation to broader legal and bureaucratic environments. For most of my interlocutors it was relatively easy to secure a legal permission from the state authorities to collect the space metal. But if this was not possible, fortunately, the location of the community, its size and spatial dispersion along with a combination of various subsistence strategies (Scott, 2009: 333-334) contributed to the villagers' relative “independence” from particular forms of state control. For instance, the inaccessibility of the village by regular roads made it difficult to carry out policing or resource control inspections:

They don't come here, [inspections] from the district centre, it's expensive to crawl on this shallow waters. Well, earlier in the spring, [someone] complained [that we have] built [space] metal boats. So they came and then the other day they broke a good [boat] engine on the shoal, and that's it. They don't come any more. Must have been ten years ago. Yeah, who knows. I don't remember, sometimes they come to Buchye [where the regular road ends] and that's it. Whoever needs to be caught, and whoever does not need to be caught will not be caught. They don't [even] touch the [fishing] nets here. (An interview with Andrei. January 18, 2019)

If a truck full of the space metal would be checked by police once on a way to the collection point in Arkhangelsk it would be confiscated, and in the worst case, a criminal violation report would be drawn up. Nevertheless, it almost never happened. Consider, for example, this case told by Alexei Gennadievich, one of the scavengers, explaining why they had every right to own and dispose of the space debris at their own discretion:

Why do they have to stop us? It's a good thing that the metal doesn't fall on our heads. We had a car [with the boosters] stopped on the road [by police] while going to Novodvinsk. A police captain came at some point and let us go. He said to others: “Let them go, for fucks sake, you don't know anything about how they live!” (An interview with Alexei. August 9, 2020)

Here, remoteness grants an advantage not only in the independent informal use of the surrounding resources (fish, meat, timber, and boosters). Living in the seemingly isolated village, in the seemingly dangerous vicinity of the fallout zones, with ‘unobvious’ ways of sustenance is seen by the police captain as a legitimization of certain violations and is perceived as critical circumstances, as critical circumstances, at the expense of which the inhabitants of remote villages can recognise the moral right to salvage and use space metal. The same approach turns out to be crucial in the informal decision-making process of government officials when they encounter violations of the law on the part of the Mezen residents.

While the authorities themselves showed little interest in regulating or controlling the new occupation of the villagers, the expansion of the scrap metal recycling industry in nearby cities and wild proliferation of private entrepreneurship (cf. Watts, 2002), most prominently presented by the urban middle-men, fuelled local interests in the boosters. Thus, becoming an important source of income, space metal scavenging flourished through the 1990s till the mid-2000s. Setting to the fallout zones, most of the men worked there on their own or with a couple of their close relatives or friends. The boosters’ scavenging was nearly always a collective enterprise — it was too difficult and time-consuming to saw and transport the metal alone. The boosters found by the scavengers were shared among them; if the metal was collected for the household, it was divided by the quality of the material and distributed according to the contribution of each to the work of the brigade (most often one’s share dependent on who was the owner of transport and tools). If the metal was going to be sold, the income usually would be divided in equal shares.

However, in the early 2000s, scavenging and transporting the metal became problematic. The boosters lying close to the village were collected promptly enough and, given the continuous rise in gasoline prices, the costs of transportation to the fallout zones and back barely met the income from the recycled metal — the district’s merchants were paying only half of the price offered for the boosters in Arkhangelsk, and again, almost no one could afford regular trips that far. Consequently, in many other Mezen villages, the inability to recoup expenses caused the enterprise to fade.

Nevertheless, several scavenging brigades were formed in Krecheulovo, who continued to salvage the boosters (Figure 7, 8). One of the brigades was organized by Andrei Fedotov, a former state farm tractor driver in his forties, who was actively engaged in collecting and selling scrap metal. Simultaneously working as a trader he was able to accumulate enough money to keep his brigade afloat.

Iron costed, say, 36 rubles, and they [in the district centre] were buying it for 14 from us. I started [to scavenge boosters] at that time, and soon I got tired of working for next to nothing, so I bought a car and took [the debris] to Arkhangelsk myself. A four-wheel-drive Gazelle. It was my first car. One-two can fit. You drive it, and it's enough, you're up to your ears in money. (An interview with Andrei. January 18, 2019)



FIGURE 7. Andrei holds a piece of a rocket. January, 2019.

While most scavengers in Krecheulovo turned in only precious metals and easily transportable debris, Andrei began to salvage all kinds of scrap that could be found in the fallout zones. The income from a few tons of aluminium brought to town and turned in for scrap metal was several times higher than the average monthly wage in the village. Direct access to the market in the city allowed Andrei to buy handy customised

saws, snowmobiles, maintaining the brigade made up of his fellow villagers as paid workers. Thus, the ability to organize and provide solid income for the brigade was facilitated by his trade business. In addition to the extra profit, this made it easier for Andrei to transport his cargo with no additional cost and allowed him to differentiate his sources of income.



FIGURE 8. Alexei poses atop a “Soyuz” rocket booster. January, 2019.

Nikolai, introduced in the beginning of this chapter, lost his job by the mid-1990s. Just as Alexei, he was one of the first in the village to organise a brigade of scavengers. Together with his close friend and neighbour, he spent weeks in the taiga stalking the boosters, as they combed the forests and swamps near their hunting grounds. Crossing hundreds of kilometres during the summer season, he was mastering the landscapes of the fallout zones; each booster he found Nikolai marked with his hunter’s insignia, indicating the owner of the booster. With the first snow, he was returned again to the fallout zones, where he sawed the boosters and prepared them for transpiration. Later, by the end of winter, with a solid snow cover in place, his brigade rolled roads and built bridges over ravines and slopes of frozen rivers to take the space metal away and sell it in Arkhangelsk. These long weeks spent in the taiga and practical

engagement with the boosters allowed Nikolai to learn the boosters' "behaviour" — their trajectories and the main places where he could expect to find them after the next launch. Most importantly, his pursuit of the boosters provided him with a feeling of dignity, as he could maintain his image of a breadwinner for his family in the eyes of his loved ones and neighbours.

Nikolai's case brings forward an understanding of the possibilities that boosters promised to the scavengers. The boosters were actively engaged in shaping broader social relations in the vicinity of the fallout zones, as they were forming specific socio-material configurations (Harvey & Knox, 2014: 4-7). They became the entities that draw humans and things, in relation to each other (Hodder, 2016), in the endeavour of the villagers to make it through the precarious times. Nikolai's engagement with the space debris offered affordances, or alternative and open-ended opportunities, ushered from the materials themselves (Reno, 2020; Ingold, 2000). As Joshua Reno (2020) claimed, discarded objects acquire a quality of indeterminacy or plasticity, meaning that there are always several things that can be done with them. As the scavengers were attuning themselves to the environment of the fallout zones, they developed skills of perception and action that aligned "to the features of a world that is ever brought forth into presence by way of their own activity" (Ingold, 2018: 40). In this light, the boosters became "unsettling objects" (Silva, 2014: 184); they engendered conditions for social productivity simultaneously disturbing and rendering lives in the vicinity of the space infrastructure unstable.

2.4. Gendering Labour and Landscape

Krecheulovo men's knowledge and experiences as skilled hunters and fishers helped them not only to cope with crisis, but to maintain their physical strength and knowledge about the disturbances and changes their community was going through (cf. Lounela, 2019: 70). As the post-Soviet transformations were changing the distribution of the power to gain, maintain, and control various resources (Stahl, 2010: 140; Nakhshina, 2012), they were also transforming modes of engagements with the

surrounding landscapes and, consequently, social relations. Simultaneously, the boosters were changing the perception of Northern landscapes, opening up new possibilities for Krecheulovo men and allowing them to maintain and (re)produce gendered subjectivities in the fallout zones. The boreal landscapes that intersected with the fallout zones played the role of gendered spaces — “dynamic sites of re-evaluation and mediation of power relationships” (Dowler, Carubia, & Szczygiel, 2005: 5) — ordering social experience of men coping with crisis.

Hunting, and later scavenging, within these lands were defining hunters’ gender status and male hierarchy in the village, re-producing power relations that separated male and female practical (time-)spaces (Bender, 2006: 306). I want to place an emphasis on the manner in which space metal scavenging could be understood in a performative manner — constituting scavenger subjectivities and gendered identities through “a series of acts which are renewed, revised, and consolidated through time” (Butler, 1988: 523). Here, gender became salient through work, discourses of gender and the performance of subjectivities in particular places (Nightingale, 2006: 166; see also Hanson & Pratt, 1995; Massey, 1994).

The spatial arrangements of the fallout zones and heightened mobility of the scavengers they require, facilitated the exchange of knowledge among men and “support[ed] an unequal distribution of socially valued knowledge between women and men,” and thus “contribute[d] to the reproduction of gender stratification” in the village (Spain, 1993). Thus space metal scavenging became an important practice within which gender was (re)inscribed.

CHAPTER 3. Mastering the Fallout Zones

By looking into continuities in the villagers' relations with the landscape designated for the fallout zones, this chapter scrutinises how scavengers live and dwell in the fallout zones. I look into how these landscapes were encountered and understood by scavengers developing "specific dispositions and sensibilities that lead people to orient themselves in relation to their environment and to attend to its features in the particular ways that they do" (Ingold, 2000: 153). In doing so, I ground multi-scalar experiences and representations of the fallout zones, discussed in the first chapter, in place-making activities of the scavengers who were taking hold of these unfamiliar terrains.

3.1. Knowing the Land

"It is through dwelling in a landscape, through the incorporation of its features into a pattern of everyday activities that it becomes home to hunters and gatherers" (Ingold, 1996: 116). In this perspective, knowledge of the world is gained through the perceptual engagement and movement within the landscape as a vibrant place that requires one to attune their senses and movement to the surrounding environment. In the context of Krecheulovo villagers, who would later begin to scavenge space debris, similar entanglement with the surrounding landscape was occurring during hunting and fishing when they were nurturing the ecological knowledge of their hunting grounds — of the forests and swamps, the habits of animals and the skills to predict their intentions and actions in order to procure them. Skills, as capabilities of action and perception, were cultivated and nurtured through practical activities, hands-on familiarisation, and experience in the performance of particular tasks (Ingold, 2000: 5) By learning how to move on this land, through "time-space routines" (Tilley, 1994: 16), the hunters were coming to know the landscape and establishing social relations with particular places and it is through "knowing the

land” (Anderson 1998, 2000; see also Ventsel, 2012: 316; Brandišauskas, 2012) that the sense of belonging to the land and land entitlement was taking on its significance.

The main markers of the moral possession of land for Krecheulovo's hunters are *putiki* — trails — where a hunter sets his traps to capture game birds or valuable fur-bearing animals, such as marten, ermine or sable. Hunting huts (*izbushka*) built within the vicinity of hunting paths or fishing grounds are other markers that link their owners to the land. Once in place, the hut, as a critical node of human movement within the landscape, entangles the paths that a hunter follows on his long trips to the taiga. Together, with the tracks, it is considered as his property and can be inherited, transferring the right to exercise control over a certain territory among kin.

The hunting huts and paths are looked after by their master, who constantly renovates it and maintains a basic supply of firewood, salt, matches, and other items that may be useful in the forest. The owner also cares for the surrounding area by “putting things in order” such as cleaning the forest or lake from windbreak. Hunting grounds become the fundamental forms of embodied experience — the site of a powerful fusion of self, space, and time, reflecting qualities of its occupants (Casey, 1996: 27). This built environment plays a central role in the social life of the hunters and how they mentally order and understand their environment (cf. Morton, 2007: 158-159; Carsten & Hugh Jones, 1995: 39). Entwining the materiality of things and the sociality of subjects, huts and traps mediate people’s actions, structuring social networks and behaviour patterns (Nakhshina, 2013; Anderson, 2013). This bond to specific places gives their owner authority over the local resources, while restricting others’ abilities to hunt within these lands — the use of these territories by others is associated with a strict prohibition on appropriation of other hunters’ prey or damage to other people's property.

Nevertheless, one’s right to exercise control over the land remains open to the challenge by other more experienced actors. As a claim, the land never wholly belongs to its owner; anyone in need can use a hunting hut, as long as he or she does not violate the accepted social norms of the community. A hunting ground exists not as a single unit, but rather as a network of places or hunting spots linked by the movement of their

master, who claims to own not the land, but the animals and other resources enclosed within his possessions (cf. Ventsel, 2005; 2012).

3.2. “Let’s Go to the Forest, Procure a Rocket”

The hunters’ knowledge and social norms associated with their built environment played a principal role in the nascent craft of space metal scavenging. They provided a chance to ground hunters’ experience within un/familiar landscapes and accumulate the knowledge of the fallout zones. Here, in order to elicit how the scavengers were getting to know and engage with the active appropriation of the fallout zones, I introduce an excerpt from the interview with Vasilii Nikiforovich — the head of the third scavenger brigade from Krecheulovo and an experienced hunter, who started to work in the fallout zones in the 1990s.

Vasilii: It took me two weeks to reach [the fallout zones] on foot. I brought some food along and walked for one week. As soon as I was starting to run out of food, I turned around and headed back. I also had a tent.

Author: And how long did it take you to reach the hut?

Vasilii: The hut is thirty kilometres away, and I do ten hours of walking. I carry a load, it should not take long if you run, but [when carrying heavy stuff] you keep on walking anyway, still you have enough food. As you consume it, the load gets lighter and then, at a certain point, it's time to turn back. Sometimes you drop in somewhere, things might slow you down, you get interested in stuff. You might think of reaching out for a hut to find more food there. Or you can just eat berries. You get tired. It's in summer when you look for boosters. During one summer you might walk one thousand kilometres. [When] the rocket falls, boosters are discarded in the area of no more than four kilometres. They may fall at a two kilometre distance from one another. [But] at a seventy meter distance you no longer see the rocket — at fifty meters you could still do — it's impossible to notice it at a seventy meter distance. If you find [a booster] within this square, look for three more. Here they [other hunters looking for boosters]

work, then they go broke and lose everything. If all can be easily carried away from the swamps, spotting things in the forest is a hard task! And, as for me, I always do my own calculations. What is more, they [boosters] usually fall like a hare running. Almost like a principle. And also, I don't know why, they are kind of attracted by the lowlands—if there is a stream and some sort of vortex, the flow pulls them in. So, you need to check all the lowlands first. If you spot one [stage], keep on searching. That's it, and carry it in mind that this thing flies from the height of thirty kilometres and somehow it still has its air flow, but the lowland pulls it in. Pretty interesting, isn't it? And it does not do it on purpose, it's uncontrollable. The lowlands attract it, that's for sure! (An interview with Vasili. January 25, 2019)

As this case demonstrates, Vasili's knowledgeability was grounded in a capacity to situate information and understand its meaning in the course of direct entanglement with his environment (cf. Ingold, 2000: 21). Personal relations with the landscape were nurtured in a practical engagement with the landscape of the fallout zones, enmeshing the knowledge about the boosters into the hunter's ecological knowledge of the region. In Vasili's case his hunting hut supported his ability to move within the fallout zones and, similarly to hunting, become a critical node in accumulating experience and the specific knowledge. "When it [space metal scavenging] started, the state farms began to collapse, that's it, there was total unemployment, — Vasily told — A lot of people went to the fallout zones. There was a time when eleven of us slept in that hut. All went to get themselves [some metal] for the boats. There was a sea of rockets back then, and each would find a rocket for himself." Contrary to the hunting ethics of the villagers, having a hut in the fallout zones did not mean its owner was entitled to possession of the boosters falling in its vicinity. Although, as I will demonstrate further on, particular cases could be disputed.

Thus, at first, the huts were becoming a base for anyone wishing to salvage boosters. At the same time, the abundance of the space debris did not require any special social regulations. If it was obvious that someone had already started to carve a booster,

it was bypassed. However, as the number of boosters reduced and competition among the villagers increased, scavengers began to mark their booties.

So here you go, you bump into something and leave your mark — well, just cut something out there. So, if someone else sees it, they will know who it belongs to. Our foreman leaves his own mark. And you know at once if it belongs to Sergey or Misha. We have never touched other people's stuff. You put a mark, mine says "VN" and that's it. I do not touch theirs and they do not touch mine.

(An interview with Vasilii. January 25, 2019)



FIGURE 9. A hunter marks a boosters with his surname. Courtesy of Alexander Sergeevich. March, 2019.

Marking became one of the elements of the local social norms, widely involved in the regulation of the new resource's procurement. Apart from the boosters, villagers used to mark trees in their hunting grounds and near their hunting trails, as well as their equipment or things they have crafted. Tree trunks brought in by the river during the flood were similarly marked with one's insignia. Marks left by scavengers on boosters' shells indicated that it was already owned by someone and who the person was (Figure 9). It was enough to carve initials with an axe, sign one's surname with pencil or simply to notch a booster to mark your moral right of possession. This was accepted, not only by the residents of neighbouring villages, but also by the scavengers coming in from other Mezen settlements. If a theft did occur, it was relatively easy to find the

perpetrator and losses were compensated by counter theft in a proportional amount or the conflict was resolved in some other informal way. This could be exemplified by a story of a theft told by Evgenii Petrovich, a friend and colleague of Vasili:

Evgenii: If you drive up, and it [the rocket] is already prepared, sawed into pieces ready to be taken away, do not try to saw it. If you find “reserved” written on the rocket, you should not cut it, either.

Author: Why?

Evgenii: Because it’s not a good idea. The place is not busy, we will still find one another. Once there was an incident: we prepared a booster and were planning to get back by an ATV to pick and pull it away . . . But as soon as we arrived, we found the back part left with nozzles and [someone else’s] saw left. All the rest was missing [stolen]. We took the saw and wrote our location on the iron, the place where our hut was situated. They did show up, we had a talk and reached a compromise . . . We took their weapons and cash, “When you load everything onto the car, you will get your weapons back.” And that’s it, no scandals, and now we get on well with them. Well, if you see the stuff has been prepared by someone, why should you touch it? (An interview with Evgenii. August 27, 2020)

Despite the fact that almost all residents of Krecheulovo were involved in scavenging boosters, for the majority, the rockets remained a source of reliable material to use in a household or a situational opportunity to earn money. Most of the fallout zones’ territories were mastered by small brigades, which made booster scavenging one of the main sources of their income. There were four such brigades in Krecheulovo. As already mentioned, by combining income from private entrepreneurship, trade, hunting, or regular work and state subsidies, the members of these brigades were able to set an enterprise page enough not only to cover the costs of tools, equipment, and fuel, but to also secure some profits. Foremen of these brigades, such Nikolai, Andrei, and Vasili, became the main actors domesticating and appropriating new terrains of the fallout zones, going beyond their familiar hunting grounds.



FIGURE 10. Nikolai's base in the fallout zones. Courtesy of Nikolai Anufrievich. February, 2004.

For each brigade, living for months in the huts established within the fallout zones allowed them to familiarise themselves with the surrounding landscape and promptly mark and appropriate the boosters within the vicinity of their bases (Figure 10). Others perceived a specific area of control by a particular brigade if that brigade was successful at securing and procuring boosters along with time and labour invested in building and maintaining scavenging infrastructure that ultimately transformed the fallout zones. In some cases, this supported brigades' authority over these lands and the boosters that could be found there. One's mastery of places, constant skillful and successful scavenging of space debris within a particular area gave a brigade the right to challenge the others' right for boosters found nearby their grounds. For example, despite the general recognition of ownership of the rocket to the one who first found and marked it, a conflict could sometimes arise if another scavenger would procure an unmarked booster in the vicinity of other brigade's, using its infrastructure to haul away the metal.

Vasilii: Sergei came here once, he was yelling something at us. He got at us over here. He made a hut there [for his brigade], on the river, and I went across

the river and found three rockets there. I thought, okay, I would not take three rockets, but there's one right here, convenient [for transportation] and it's, you know, in one piece. And it's not far away. I thought I'd take this one anyway. And then I stripped off [some details from the boosters], took off the [titanium] heads, and then I think, okay, the hell with them, I was too embarrassed to carry them. I was making my own way [to the rocket], and then I think, they are lying right by the road [of another brigade]. Well, I think, okay, let's take them out through their road. But they have a bridge, they built it across the river. So he [Sergey] was pissed off and got mad at us [about using his road]. I called him up, you come to my place, and we'll sort it out. [...] What are you threatening me with? What are you threatening me for, are you stupid or what? Come here. And he stopped calling anymore.

Author: What was the point of the conflict?

Vasilii: I took the rocket from him right by [his] road. But he didn't see it! He kept going out there, but he couldn't find it, and it was right there. He said, "I'd have found it one day." But I would have found everything here without [bothering] them. (An interview with Vasilii. January 25, 2019)

This conflict exemplifies how the spatial organisation of the built environment organises relationships between the scavengers. It re-produces the social meanings, concerning matters such as power, wealth, and social statuses, within the landscape and reinforces the power of scavengers to decide who has access to local resources or, at least, to claim and contest others' catch. Mitch Rose, who theorised how humans appropriate the world we live in, suggested that dwelling should be understood "as a modality of practice that makes the world visible to ourselves and others through marking and claiming" (2012: 758-759). Here, building of material objects or environments marks out the landscape of fallout zones, apportioning and setting it apart in a way that allows hunters and scavengers to claim it as one's own. Marking its owner in the social space and entrapping hunter's activities onto the landscape (see Ventsel, 2012: 322), the built environment indexes moral possession of these lands and moral legitimacy of their owner to hunt or salvage boosters there.

This, I believe, helps us to clarify not only how the scavengers were coming to know the fallout zones, but also how to gain a foothold in the landscape and engage in building and active appropriation of previously unfamiliar terrains, shaped by social and political transformations extending beyond a geographic locale to wider spatial fields of power relations, linking the fallout zones with national histories of the Russian space exploration.

Conclusion

Space boosters are the signs of modernity, exploration, mobility, and at the same time, of exclusion, contamination, and abandonment. Their affective histories shift from utopia to ruination (cf. Schwenkel, 2013) and their social lives provide ways of knowing and of making sense of Russian space program that bridge the maintenance of space infrastructure in the local struggles with environmental precarity and political uncertainty.

New technologically enabled scales associated with space exploration require the creation of “places” or sites for technological intervention, where deterritorialisation of some human abilities goes hand in hand with the territorialisation of their actual practice and its effects. The boosters shift our analytic centre to the margins of space infrastructure on Earth and bring to light the affected public and human-thing entanglements, which have been obscured by the dominant discourses of Russian military-state authorities. They provide the possibility to rethink space exploration as contamination, which extends to outer space the earthly desires that have devastated landscapes and lives on Earth (see Tsing, 2015), at the same time reminding us that “‘peripheral’ spaces are, nevertheless, central to their inhabitants and their neighbors, who question the logic of extraglobal conquest in the face of unresolved Earthly injustices” (Klinger, 2019: 22).

The fallout zones, I contend, are at once places of a processual nature, crucial for the formation and articulation of space infrastructure, and spheres of friction, localities where heterogeneous and unequal encounters can lead to new arrangements of culture and power (Tsing, 2005). I emphasised a consideration of agency and affective force (Bennet, 2010) regarding the boosters, and attended to the importance of materiality spatial planning in the constitution of the extraterritorial techno-political terrain of Russian space exploration. This allowed me to approach the fallout zones and space

debris as a part of “material and institutional components that give form to global projects and ideas, locating and specifying encounters and translations that achieve their solid appearance” (Tsing, 2000: 330-331).

Noticing encounters with the space debris in the fallout zone, I have troubled ideologies, intrinsic to the work of space infrastructure, that reconfigured the Mezen landscapes as the periphery of the Plesetsk infrastructure. However, as I have tried to demonstrate, the debris can engender unpredictable interactions between humans and things that go beyond conventional understanding of the fallout zones as sites of abandonment. Boosters present us with a possibility to notice the material afterlives of the space rockets beyond limited frames of extraterrestrial exploration. The interdependence of people and things in the fallout zones “derives from their role in mediating action and facilitating self-knowledge” (Telle, 2007: 215), and thus we can embrace boosters’ agentive force and power, as they enhance human abilities within heterogeneous assemblages (Bennet, 2010: 24) in the fallout zones or reify endeavours of the Russian state to access space.

At the same time, this thesis places the engagement with the landscapes of the fallout zones and the space debris within historically particular context, demonstrating how the space metal scavenging flourished in response to the experience of abrupt uncertainty after the dissolution of the Soviet Union. The disturbed landscapes of the fallout zones, altered by the process of space exploration, mediate social relations, entering directly into people’s ability to act upon the world. As it was argued by Tsing (2015: 86), studying Oregon forests devastated by the timber industry, polluted landscapes can generate open-ended possibilities. Following this understanding, ruination and contamination spawned by space industry are not simply the ends that have no leftovers (Tsing, 2015: 21), but are the beginnings of world-making projects, where “humans are always in composition with nonhumanity, never outside of a sticky web of connections or an ecology” (Bennett, 2004: 365).

With my ethnographic accounts about the encounters within the fallout zones, I demonstrate that getting through the precarious times is not solely limited to the human agentive force. Personal experience of crisis and engagement with the boosters brings

forth modes of social action that help the Mezen villagers to come up with alternative methods of survival. Apart from provoking discontent and feelings of powerlessness, boosters engender new ways of making a living and contribute to a personal feeling of social security. Thus, scavengers' practical engagement with the fallout zones allows them to assert greater control over their lives and navigate themselves amidst abrupt uncertainty.

Finally, the focus on the skillful engagements of the scavengers with the fallout zones demonstrates that these landscapes are co-produced by numerous situated activities of the villagers along with other variously situated translocal projects and actors. Attention to the formative encounters between Krecheulovo villagers and space debris helps to restore their agency, demonstrating how these disturbed landscapes were incorporated into the practice of everyday life. This embodied understanding of landscape has a political charge, as the foregrounded narratives and representations of landscape can contribute towards the struggles of the villagers for power within contested politics of the northern landscapes.

Résumé

KOHTUMISED KOSMOSE INFRASTRUKTUURI PIIRIMAIL: KOSMOSEPRÜGI JA PÕHJA-VENEMAA KÜTID PÄRAST NÕUKOGUDE LIIDU LAGUNEMIST

Töö etnograafiline fookus on Põhja-Venemaa Plesetski kosmodroomi tagasiheitetsoonid Arhangelski oblastis, kuhu on langenud kanderaketid pärast orbiidile tõusmist. Alates 1960. aastatest on tsoonid muutunud ulatuslikeks riigisisesteks kosmoseprügiga kaetud nn prügimägedeks. Langemistsoonide lähedal elavatele kogunud küttidele on need äärmiselt mitmetähenduslikud maastikud, mis ühelt poolt on nähtamatu saaste tõttu ohuks nende tervisele ja heaolule, kuid teisalt pakuvad võimaluse prügi kogudes ja müües end ära elatada.

Uurimistöö vaatab, kuidas Mezeni jõe äärsed külad on seotud kosmose avastamisega olles omamoodi perifeersem osa Plesetski kosmodroomi infrastruktuurist ja seda, kuidas külaelanikud kohanevad nende maastikega kasutades kanderakettide osi erinevatel viisidel. Sealjuures toon esile, kuidas kohalike külaelanike seotus kosmoseprügi ja tagasiheitetsoonide tekkimisega on omakorda seotud keerukate võrgustike ja võimusuhetega, mis tekkisid Põhja-Venemaal pärast Nõukogude Liidu lagunemist.

Kasutusest kõrvaldatud kosmoseprügile tähelepanu osutamine heidab kriitilise pilgu inimkonna kosmoseprojektide ulatuslikele võimusuhtele ning nendega seonduvatele ja praegugi jätkuvatele hävituslikele protsessidele. Samal ajal paljastab see kosmoseuuringute argiseid vastasikuseid sõltuvaid aspekte, mis ei sobitu otseselt tavalistesse planetaarsetesse või kohalikesse mõõtkavadesse ega võta sellest mõjutatud avalikkuselt ära oma agentsust. Kosmose infrastruktuuride läheduses olevaid eluvorme

saastades ja elu destabiliseerides pakuvad katkised kanderaketid raketikatsetustest mõjutatud inimestele siiski uusi võimalusi hakkamasaamiseks.

Esimene peatükk arutleb maastikupoliitika üle tuues esile konfliktid, mis tekivad seoses inimeste erinevate arusaamade ja kogemustega põhjamaastikel. Siinkohal uurin erinevaid põhjamaastike kuvandeid, mis kutsusid esile kohtade teisenemist ning muutusi Mezeni külaelanike isiklikes kogemustes ja teadmistes.

Teine peatükk selgitab konkreetse piirkonna ja tagasiheitetsoonide kohaloome sotsiaalset ja poliitilist konteksti – postsovetlikku kriisi Põhja-Venemaal, perioodi, mil kerkis esile kosmosesõidukite metalli kogumine. Võttes postsovetlikku kriisi oluliseks taustaks, näitan, kuidas tagasiheitetsoonide maastike ja kosmoseprügiga suhestumine on ajalooliselt piiritletud ning kattub laiemate sotsiaalsete ja poliitiliste sündmustega. Samal ajal näitan, kuidas tagasiheitetsoonide maastikud said osaks sotsiaalsetest võimusuhetest, mis olenesid ka prügikogujate soost ning muudest kriisiaegsetest sotsiaalse identiteedi markeritest. Kolmas peatükk uurib üksikasjalikult, kuidas inimesed elavad maastikel ning kogevad maastikke, mida muudavad põhjalikult nende endi tegevused ning mida mõjutavad ka silmapaistvad kosmoseuuringute tagajärjel tekkinud translokaalsed protsessid. Kosmoseprügi korjajatelt kogutud etnograafiliste andmete põhjal järeldan, et nende maastikukogemust on kosmoseprogrammid põhjalikult muutnud. Keskendudes tagasiheitetsoonidele kui protsessuaalsete iseloomuga kohtadele arutlen, kuidas mehed, kes 1990. aastatel nendes piirkondades liiklesid, on ühes teiste translokaalsete teguritega samuti seotud kohaloomega; ning sellega, kuidas neid maastikke kogeti ning mõisteti. Seejuures näitan, kuidas tagasiheitetsoonide maastikud omandati ja markeeriti enda omaks materiaalsete objektide ehitamise ning muu ümbritseva kaudu. See taaslõi kogukonna sotsiaalsed tähendused maastikus – mis puudutab võimu, vara ja sotsiaalsete staatuste küsimusi – ning andis prügiküttidele taaskord õiguse ja võimaluse kasutada tagasiheitetsoonide piirkondadest leitud kanderakettide osi ja muud materjali.

Leian, et tagasiheitetsoonid on nii protsessuaalse olemusega kohad, mis on äärmiselt olulised kosmose infrastruktuuri formuleerimisel ja sõnastamisel, kui ka teatud hõõrdeteguriga sfäärid, paikkonnad, kus heterogeensed ja ebavõrdsed kohtumised võivad viia uudsete kultuuri ja võimu paigutusteni.

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