

Logbook

Foreword

This logbook is a synthesis of notes taken during the course "Extracted places in transition", a multidisciplinary PhD seminar held in the Swedish Arctic between October 3 and 8, 2022 and co-organized by the REXSAC and MinErAL research networks. This immersive experience is the follow-up of a similar seminar dedicated to mining communities in transition that was organized in Northern Quebec by the same networks between May 27 and June 4, 2019. This logbook contains remarks made during formal and informal meetings with various stakeholders: academics, Indigenous and non-Indigenous residents, government officials, mining companies, miners, and other third parties. Given the format of this exercise, this journal also contains personal thoughts based on observation, intuition, or feeling.

MinErAL is a Canadian research network on mining and sustainable Indigenous livelihoods, funded by the Social Sciences and Humanities Research Council (SSHRC). REXSAC is a Nordic Fenno-Scandinavian Centre of Excellence funded by NordForsk that focuses on resource extraction and sustainable Arctic communities.

A few words about Norrbotten...

Our research trip took place in the Swedish county of Norrbotten. The county of Norrbotten is about 1/4 of the total area of Sweden and is crossed by the Arctic Circle in its northern part. Thanks to the Gulf Stream and other geomorphological features, the region enjoys much milder climatic conditions than in Canada, which allows for activities such as agriculture and forestry. At the same latitude in Canada, we would be in a polar environment, with no trees or arable land. If we continue this comparison with Canada, the north of Sweden is much more equipped with all kinds of infrastructure (roads, railroads, energy lines, public services, higher education institutions...), which considerably favors economic and social development. The county capital, Luleå, is a good example with a population of 78,000, a steel industry and a university. At the same latitude in Canada, the majority of human communities would not exceed 2,000 inhabitants and would not have access to most of the facilities and services available in northern Sweden. These few points of comparison already illustrate the variety of ways of living in northern spaces.

The journey...

Day 1: Luleå and Laver

October 3rd, 2022

We started our stay at Luleå University of Technology, the northernmost university in Sweden. We attended several presentations to introduce us to the history, geography, climate and politics of the region. We had lunch and then left in two vans for our first stop: the abandoned mining community of Laver.

When the mining community of **Laver** was built in the 1930's, it was a modern town, actually one of the most modern towns in the country: new heating system, electrical appliances, running water, air conditioning, etc. Many services were offered to the inhabitants: a school, a grocery store, but also a swimming pool and even a cultural center with a cinema. None of this exists anymore. All that remains are the foundations of what was once a community of nearly 350 inhabitants. The Swedish mining company Boliden AB decided to close down the operation in 1946 because of the low copper concentration in the deposit and the falling price of copper on the world markets. A planned dismantling of the town took place, and the inhabitants were moved to other mining sites in the Skellefteå district. Overall, Laver was inhabited only 10 years after its construction.



From left to right: Remains of Laver. Former mining pit flooded and filled with mining waste.

Bottom: New mining projects could extend over a large portion of the valley.



Recently, mining companies are expressing renewed interest in the region and are prospecting for minerals, much to the dismay of environmental groups and reindeer herders who are mobilizing against such development. Among them is the former founder of Laver: Boliden AB, now Europe's third largest producer of zinc and copper. After a denial of its permit application in 2020, Boliden has gone to the Swedish Supreme Administrative Court in 2021 to challenge the government's decision.

To be continued... We took the road again and arrived in Arjeplog, a town of 2600 inhabitants where we spent the night.

Day 2: Arjeplog et Laisvall

October 4th, 2022

The municipality of **Arjeplog** attracts many car manufacturers from Europe and Asia to test their vehicles in winter conditions. Today, this industry represents an important source of income for the town. In the morning, we went to the Silver Museum, where we received a presentation on the Sami condition in Sweden, and then looked at the collection of Sami artifacts and the archives on the history of the municipality.

From left to right: Front of the Silvermuseet. Photograph of a Sami family.



We then got into the vans and headed to Laisvall, an old mining community located on the shores of a lake a few kilometers from Arjeplog. The community was created to exploit the Laisvall lead mine, operated by Boliden AB (the same company that founded the community of Laver). From 1941 to 2001, the mine was the main provider of employment for the community. However, human occupation of Laisvall and its surroundings predates the mine. The Sámi grazed their reindeer here and a permanent non-Sámi community was built in the late 18th century.



Throughout the second half of the 20th century, the Laisvall mine was the largest lead mine in Europe and extracted more than 60Mt of ore. But when the government refused to extend the mining area (which would have required the detour of several rivers), Boliden submitted a decommissioning plan in 1997 and announced the closure of the mine in 2001.

Top: View from the Laisvall tailings. The lake below could suffer environmental impacts due to water runoff.

Today, massive tailings dominate the surrounding landscape of lakes and rivers. These mounds present many environmental hazards, such as acid mine drainage. They are here to stay for a long, long time.

Following the closure of the mine, the community of Laisvall attempted to attract the car testing industry, but the latter preferred to settle in Arjeplog. Nevertheless, although its population has declined, the community of Laisvall lives on. The presence of recreational and sports facilities, as well as its location, has attracted a population of young Swedish and Norwegian retirees who seek peace and nature, and who maintain a certain level of activity.

Day 3 : Jokkmokk, the Lule River and Malmberget

October 5, 2022

We arrived at **Jokkmokk**. This commune is a historical place of meeting, exchanges and residence of the Sami populations of the area. Jokkmokk. It is also the name of my table and chair set bought at IKEA, another Swedish company whose survival depends on the massive extraction of natural resources (cf. the primary forests of Romania). But we were not stopping in Jokkmokk to talk about the transformation of its name into a commodity by a big capitalist company... at least, not today. We were in Jokkmokk to visit the Sami history museum. The place was well supplied with artifacts and documentation (although most of them were not translated in English). While we didn't have the opportunity to explore the town further, it was an interesting stop to learn more about Sami history and culture.

We spent the rest of the day hopping between different hydroelectric installations located on the Lule river: Harspranget and Porjus. It should be noted here that almost all rivers in Sweden are dammed (an estimated 11,000 dams in total and 2,000 that produce energy). Therefore, it is simply impossible to talk about land use, industry and mining in Sweden [*and their links to human and animal communities*] without talking about dams and hydropower.

We stopped to observe **Harspranget**, the largest hydroelectric power station in Sweden (977 MW), whose construction [interrupted many times] began in 1918 until it was put into operation in 1951. A wooden walkway led us to a viewpoint on the dry riverbed of the Lule. In the past, spectacular rapids could be seen here, which were immortalized in 1856 by the lithographer Julius Helleesen (see below). These paintings were part of a nationalistic and romantic art movement that aimed to anchor nature in the national identity.



One would be tempted to lament the disappearance of the marvelous panorama which had made the fame of Harspranget. But one must admit that the view is still worth the detour. Whether we fight it or celebrate it, industrial development never destroys an environment without creating a new one. We may appreciate it less than the previous one, but this new environment creates new representations, identities, and

stories. And in the same way that one can take pleasure in contemplating an urban or industrial environment made of concrete and steel, one can take pleasure in contemplating the enormous rocks that once were engulfed by the waters. Tourism around energy infrastructures that are still in operation and the patrimonialization of these infrastructures constitute an additional dimension of land-use planning and its consequences on representations and communities (cf. In the United States, the Hoover Dam attracts millions of tourists every year). Nevertheless, the capacity of these infrastructures to generate tourist revenues could well be impacted by climate change.

Bottom: Views of the Lule riverbed from Harspranget.



The Porjus dam, the next installation that we took time to observe, was decorated with a large Sami mural. This mural has been the center of some controversy within the Sami community. Decorating a dam, an infrastructure whose consequences on land-use have been repeatedly opposed and denounced by the Sami communities of Fenno-Scandinavia: is it an act of identity affirmation or an act of submission?



This question brings us back to much broader debates on the complex relationship of indigenous people to infrastructure and economic development...

Above: The dam of Porjus..

Bottom: Reproduction of the community of Malmberget in the 19th century.

We ended the day in the town of Malmberget (literally "the mountain of ore"). The extraction of iron ore dates back to 1741. But it was not until the second half of the 19th century and the arrival of the railroad that the town developed further, as did many North American towns during the gold rush. A life-size reconstruction of the original village, essentially composed of wooden cabins, allows us to imagine the harsh living conditions of the time. There was also excessive alcohol consumption, crime and prostitution [problems that are still recurrent in mining communities].



Today, however, Malmberget is known for other reasons. The gradual collapse of the mining galleries created a pit more than 250 meters deep at the site of the old town center. Although "Gropen" (cf. the shaft) has been partially filled in with rock, the shaking caused by the exploitation of the Malmberget mine (which continues to be operated by the LKAB company) makes the area unstable. Many buildings had to be destroyed or moved. Not surprisingly, the population has dropped sharply, from

10,300 in 1970, to 5,600 in 2010, and to 920 in 2020. The city continues to slowly disintegrate. Seismic sensors are placed everywhere in order to measure the risks of collapse and to proceed quickly to the evacuation of the concerned areas. Backhoes are at work here and there to destroy other buildings. We were told that in Sweden, Malmberget is designated as the "bad example" of a mining town in transition and that this was partly used to present the ongoing relocation of the town of Kiruna as the "good example" to follow. I remained pensive, curious to see how one can "well" manage the relocation of a city that is collapsing on itself because of a mine.

We spent the evening in **Gällivare**, 11,000 inhabitants, located 5 km from Malmberget. Beyond the local industrial activity, Gällivare has many winter tourist facilities. Unfortunately, we didn't have the opportunity to further visit the town. This one will have been only a short stage towards our final destination: Kiruna.

Day 4: Nautanen and Kiruna October 6th, 2022

Below: The remains of Nautanen.



The next day, we left for Kiruna. As we had enough time ahead of us, we decided to stop for a while at the site of Nautanen, 10 kilometers north of Gallivare. **Nautanen** is an old mining community founded at the very end of the 19th century to exploit copper and iron. In the beginning, the community enjoyed good living conditions according to the standards of the time (e.g. housing and community and recreational spaces provided by the mining company and the unions).

Nevertheless, the deposit proved to be much smaller than expected and the company went bankrupt in 1908, after 6 years of operation. All that remains of the community are the foundations of the houses, piles of slag and the tunnels. A testimony to the industrial, union and cultural history of the region. Recently, Nautanen has become a place of recreation for the locals. Unfortunately, the site is also known to be one of the most polluted in Sweden, despite its small size and length of operation (for more details, read: Fischer et al. 2020).

We arrived in Kiruna in the middle of the afternoon. This city with a population of 18,000 is both the largest municipality in Sweden in terms of area (20,500 km²), and the northernmost in terms of location (67°51'17"N 20°13'22"E). As we head towards the historic city center, we see two imposing mountains overlooking the city - Luossavaara and Kiirunavaara. They no longer look like natural geological formations but rather like austere, bald mounds, carefully landscaped. And for good reason, in their bowels and in their depths lies the reason for the very existence of the city of Kiruna: the famous iron ore.

The Kiruna mine is the largest underground iron ore mine in the world, and one of the oldest still in operation. Since the start of operations in 1899, the state-owned company LKAB has extracted more than 950 million tons of ore, or one third of the estimated deposit. Until the 1960s, it was an open pit mine. Nowadays, mining is carried out more than 1365 meters underground.

Before heading to our hotel, we took time to eat in an Asian restaurant located in the middle of the historic downtown. As we filled our plates at the buffet, some of us, new to Kiruna, gradually realized how strange the situation is. Like most of the stores and buildings in the area, this restaurant will be destroyed in a few years. Yes, destroyed. Because of the surrounding mining operations, the town is slowly collapsing on itself. Fortunately for the restaurant's owners, this is no surprise and the authorities have developed a relocation plan for the entire city. In fact, the new, modernized city center is already under construction, and many parts are already bustling with activity. Some buildings were not destroyed and were moved to another location thanks to some impressive logistics. Kiruna's churches have been or will be moved in this way, probably because of their symbolic aspects. As such, Kiruna is often held up as an example of "good" relocation management, especially when compared to Malmberget. Nevertheless, the transition is not over for Kiruna. While the new city center is growing and becoming more and more crowded, the old city center that is still standing is being abandoned. Intrigued by this situation, some of us decided to take a walk to compare the two city centers.

It is strange to walk through the old city center of Kiruna. Strange to think that we are witnessing the last days of a neighborhood that is slowly and quietly dying, although we can see that it was once the center of a vibrant and lively community. There are still plenty of children's playgrounds, parks, and public plazas to walk around in, though we never saw anyone take them over. Surprisingly, the old movie theater still displays posters of fairly recent movies, but its doors were closed... on a Friday night. We passed in front of the facades of numerous restaurants, bars and stores of all kinds. Anyway, most of these businesses have moved to the new city center or have been abandoned. Of course, there is still some activity in the downtown area (especially in the few bars and restaurants that are still open), but it is clear that this is not going to last. Soon the flesh will be gone. There will only be a skeleton left, which will collapse into a pile of debris and dust, swallowed up by the earth.

Logbook – Louise Nachtet



Top: Streets and squares of the old city center of Kiruna

However, the memory of the old city center is still present in many ways. Some stores display artistic representations of the city and its relocation.

Bottom: Public art performances in the city of Kiruna before and during the relocation.



A local craft beer called "Old Town Season" also pays tribute to the neighborhood on its label:



"Almost 20 years have passed since we first heard about the idea of moving parts of our city, and it is now our reality. Residents needed to add a few words to the city's name, and the concept of 'New Kiruna' and 'Old Kiruna' was invented. As the new city center comes to life this fall, we decided to pay homage and say goodbye to the old and familiar. The label shows the building synonymous with Old Kiruna as we know it."

The contrast with the new city center is quite striking. It feels like a new chic and commercial district of a large European city. Whether it is the shapes, materials or colors of the buildings, we are standing in front of an architect's vision. The magnificent city hall is a perfect example. Next to this modern building stands the clock tower that was in the old city center. A memory of the past in a new environment. The new center is made up of many stores, many of which were once in the old city center. These include places to buy furniture, home decor, clothing, children's stores, food, restaurants, cafes, a bookstore... A sports center is under construction, and many more are to come. We can think what we want about the relocation plan, but this little tour of the new city center, and the activity we saw, suggests that the community is still alive and well, at least while the mine is in operation.

Bottom: Artist's projection of what the new Kiruna city center will look like. Many of the buildings are already built. Credits: White Arkitekter



However, the projected widening of the pit raises many questions. By the end of this century, it could reach the outskirts of the new city and threaten the existence of Kiruna again. It will also reach parts of the original city that were spared by the relocation plan, such as the old cemetery. What will they do then? Will they move the entire cemetery to another location? Will this cause more outrage in the media and what kind of public image will this give LKAB and the Swedish state?

Later in the day, we climbed to the top of the mountain to look out over the city. In the distance are the snow-capped peaks of the Scandes, the mountain range that separates Sweden from Norway. This view contrasts strongly with the two huge mounds that encircle Kiruna. One can see the Kebnekaise peak, the highest point in Sweden, which rises to 2097 meters. Another record for the municipality of Kiruna.

Day 5: Kiruna Mine

October 7th, 2022

The next morning, we went to the mining facilities of LKAB. We waited a few minutes in the lobby of a massive building at the base of the mountain before being greeted by one of our guides for the day. We boarded a bus that took us to the main entrance and drove for several minutes through a dark tunnel that winds relentlessly into the depths of the mine. The entire tunnel system in the Kiruna mine is over 500 km long. We finally arrived at the visitors' center a few hundred meters down. The humid and stale air was not very pleasant to breathe but the place was much more "welcoming" than one might think when thinking of a mining site. It was a high-ceilinged space in which there was a restaurant, a museum and a conference room. It is in this room that we went first.

Below: Visit of the underground installations of the Kiruna mine.



We were greeted by a smiling LKAB public relations manager who made us watch a corporate movie. In the very first few seconds, the film talked about climate change and acknowledged that LKAB is part of the problem but that tomorrow, the company will be part of the solution. The historical role of mining in Sweden's history and how it has enabled the country to

become a rich industrial nation was highlighted. But this historical dimension was extremely brief: this movie is about the future. And for LKAB, the future is zero-carbon steel. Together with hydroelectric giant Vattenfall, LKAB intends to replace coking coal, traditionally used to make steel from ore, with "fossil-free" electricity and hydrogen. This, they say, will be the world's first fossil fuel-free steelmaking technology, with a virtually zero carbon footprint. The pitch was very enthusiastic (and will continue to be so until the end of the movie).

LKAB's public relations manager followed with an oral presentation of the company's activities. He began by talking about his personal background: his parents were originally from Kiruna and after working in the south of the country, he returned to his hometown to buy a house with his wife and two children. He said that he knew his house would be destroyed because of the relocation of the city when he bought it, but that he was okay with it. This was a very clever way to start a presentation: it humanizes the company and makes its relationship with its employees seem more peaceful.

This was followed by some figures about the Kiruna mine. Although the mine represents less than 2% of the world market, it supplies more than 90% of the iron in Europe. LKAB states that its weak presence on international markets outside the EU is justified by a concern for customer quality, not quantity. I remained a bit doubtful. LKAB is a state-owned company, and that certainly impacts the way it wants to

manage its public image, but it is still a company whose goal is to make profits. At home, the mine's impact is significant: its operations mobilize 45% of rail traffic and account for 4% of Swedish industry's total carbon dioxide emissions. The LKAB representative acknowledged that one day the mine will close but was quick to point out the company's new and exciting exploration projects.

Some notes on the greenwashing of the mining industry:

Climate change is at the heart of LKAB's discourse to justify the development of its future activities. Like many mining players, it is about promoting new economic opportunities and new representations of the industry in a context of electrification of the economy. The car industry is particularly interested in selling vehicles with a low carbon footprint and could be one of the main outlets for LKAB's zero-carbon steel. Changes in European regulations on carbon emissions are also driving this industrial strategy.

However, the production of this zero-carbon steel will require a phenomenal amount of electrical energy. LKAB plans to mobilize wind power and is not closing the door on nuclear power. However, it is primarily hydroelectricity that is being considered to support the mine's energy needs. The problem is that the hydroelectric power produced in the north is mainly sent to the south of Sweden. Therefore, according to LKAB, there is a need to produce more energy in the north, which will require more capacity and infrastructure and ultimately more land. The representative said it is not a matter of lowering environmental standards and regulations, but that bureaucratic processes are unnecessarily slowing down the development of LKAB's industrial activities and that "we cannot wait for the climate". In order to keep up with the news, one of the slides of the PowerPoint displayed that the "green" transition and development proposed by LKAB will make it possible to get rid of the dependence on Russian fossil fuels. This is not a new framing though, as nationalism and military security issues have historically been used to promote the exploitation of natural resources.

Overall, this was a very classic corporate presentation which relied on an impactful narrative to justify resource extraction in the context of increased controversy over such activities. More importantly, storytelling is an essential part of what environmental anthropologist Anna Tsing calls "the economics of appearances": the self-conscious drama necessary to raise investment funds. To what extent does the current and future demand for iron ore make further mining necessary? The mining industry has a long history of promoting a demand that is partly real and partly the product of its own rhetoric. But the industry cannot accept the idea that the challenges and opportunities of our economic system are not inevitable natural phenomena that are imposed on us, but the product of discursive processes and material relations of power. The mining industry certainly has a role to play in transforming and decarbonizing our economic system. The problem is that due to the lack of willingness to discuss what the green transition should be - which might bring the idea that we could base this transition on different values, goals, and organizational models than those that dominate under the capitalist system - all discussion of electrifying our society often ends up being greenwashing.

The presentation was followed by a brief lunch in the mine's restaurant and a tour through an exhibit about LKAB and the history of mining in the area. Was this an

exhibition on the industrial history of Norrbotten or a promotional operation for LKAB? In areas like this, it's always a bit of both.

Day 6: Svappavaara and the Torne River

October 8th, 2022

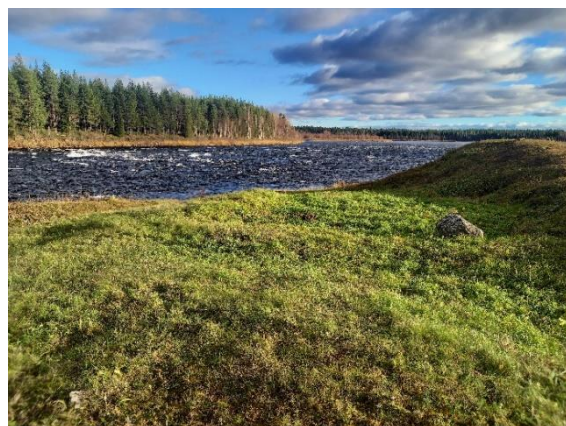
Bottom: View of a Ralph Erskine-designed building in Svappavaara.



As our trip to Norrbotten was coming to an end, we headed back to Luleå. We made a short stop in Svappavaara, a small mining community of 400 inhabitants. Mining in the area dates back to 1650, but it wasn't until 1965 that LKAB started large-scale iron mining. In 1983, production was discontinued and the mine closed. The community continued to be linked to the industry as it was involved in some of the beneficiation of iron ore from Kiruna.

Recently, mining has been restarted. Today, there are three open-pit mines around Svappavaara, but only one (the Leveäniemi pit) is in operation. Svappavaara is also home to a building designed by the architect Ralph Erskine, who is known for his many innovative mining town projects in northern spaces, including Fermont in Quebec. Like Fermont, Erskine had thought of an urban project capable to shield a sustainable community from the cold winds. However, his project was only partially realized in Svappavaara and part of the housing complex has been destroyed in 2010. This raises questions about the willingness and ability of communities and local governments to value and protect the cultural and industrial heritage of mining communities.

After a few hours of driving, we stopped at the Torne River, the largest river in Norrbotten County, both in terms of length and watershed area. It is also a natural border between Sweden and Finland. The river has been an important issue for the Swedish environmental movement. Faced with the massive construction of dams on the majority of Swedish rivers in the 1960s to support national industrial and economic development, a movement was formed to save the remaining rivers. Thus, the Torne River is one of four rivers in Sweden to be protected from development along with the Kalix, Pite and Vindelälven rivers.



Top: View of the Torne River.

Conclusions

At the end of this immersive stay in Norrbotten, a few thoughts come to me concerning the mining communities, the agency of their populations, the power relations that are played out there, and the discourses that support this order that is both stable and fragile.

First, the case of Norrbotten illustrates the diversity of trajectories that mining communities take, both during and after the exploitation of minerals: abandonment, continuation, reconversion, mortification, relocation... Many factors and actors are to be taken into consideration to explain why a community has taken a particular direction, and so on.

Secondly, the Norrbotten case illustrates the longevity of mines and their impacts on the environment and living things. Yet new mining projects are not often considered with this longevity in mind. What would happen if our societies and politicians thought of the development of mining projects as they think of the development of nuclear projects? What would happen if we considered mining waste as radioactive waste? What if we considered the costs involved in managing these toxic materials over several centuries? What if we considered the ambiguous nature of remediation of mining environments? When you think about it, a large part of our stay was spent observing "sacrifice zones". In the popular representations of environment in industrialized countries, sacrifice zones are often envisioned as pristine natural spaces devastated by human activities. A primary forest ravaged by deforestation is the most typical example. In reality, many sacrificial zones are, or have been, spaces used by human communities (often poor and marginalized) for other types of activities. An estimated 10 million people live in sacrificial zones. The fact that mining continues in Malmberget and Kiruna despite the fact that the land is literally swallowing them up reflects this sacrificial dimension: "At this point, we might as well continue".

Thirdly, the case of Norrbotten illustrates the issues related to the electrification of the economy in the context of the planned reduction of greenhouse gas emissions and, above all, of intense greenwashing. Once again, the example of Kiruna is edifying. What we see happening there is the articulation of a saviour narrative by which the mining industry intends to make collaboration inevitable, and on its terms. Mining companies, like so many others, tend to naturalize challenges and opportunities through a rhetoric that is both fatalistic and apolitical. The intended effect is to keep people submissive to them and unchallenged by the status quo. "*Times are changing, and we must adapt*". Is this a proposal or an order? What does "we" mean? Who decides what "we" means? This is not a debate mining companies want to have. There is a strong reluctance in the sector to accept conflict. "*We will find a way*" is the rhetoric most commonly used by the industry. A more enthusiastic and dynamic way of saying, "*There is no alternative*". But this rhetoric has many blind spots, the most obvious of which is, "*What if we don't reach consensus?*" "*What if the public challenges this self-assigned savior role?*" "*What if the public challenges the very structure of how our industry operates and wants to change the way it is conducted?*" These are questions that embarrass the industry. The discursive depoliticization of the economy makes it easier to ignore essential debates about democracy, choice and power dynamics.

Everyone is treated as equal stakeholders, despite the huge gaps in symbolic and material power. Mining companies do not like open and frank conflict. Consent and consensus are primarily performative goals to safeguard the company's public image.

Yet, communities and the individuals within them are unequally responsible for the challenges and opportunities that mining companies talk about. This brings me to my fourth concluding observation: the positions of communities vis-à-vis mining. Like the trajectories of mining towns, they are varied. It is not always a binary opposition between individuals who are very enthusiastic about extractive activities and those who are vehemently opposed. There is also a very common attitude of passive and fatalistic acceptance. The one that is done without much enthusiasm and by dragging its feet. For while some are quite optimistic about their ability to take advantage of the challenges and opportunities mentioned, others express more doubt about their agency. The material and symbolic elements that support such behaviors are numerous. In the case of the relocation of Kiruna, this can hardly be contested by the local population, regardless of the constraints associated with it: if the mine disappears, the town may not survive.